



STATE PROJECT NUMBERS
0095-111-259, P101;
UPC 101595
0095-111-270, P101;
UPC 105510

Environmental Assessment

I-95 Rappahannock River Crossing

STAFFORD COUNTY
SPOTSYLVANIA COUNTY
CITY OF FREDERICKSBURG

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION and
VIRGINIA DEPARTMENT OF TRANSPORTATION



U.S DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
and
VIRGINIA DEPARTMENT OF TRANSPORTATION

ENVIRONMENTAL ASSESSMENT

I-95 RAPPAHANNOCK RIVER CROSSING

Spotsylvania and Stafford Counties and the City of Fredericksburg

State Project Numbers: 0095-111-259, P101; UPC 101595
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Submitted Pursuant to 42 U.S.C. 4332(2)(C)

Approved for Public Availability

6/8/2015
Date

Mark J. [Signature]
for Division Administrator
Federal Highway Administration

Contents

I. Purpose and Need

a. Study Area	4
b. History.....	6
c. Needs – Existing Conditions.....	7
Capacity and Mobility	7
Safety	10
d. Needs – Future Conditions.....	12
Capacity and Mobility	12
Safety	13
e. Purpose/Summary.....	13

II. Alternatives Considered

a. Alternatives Development and Screening Process.....	14
b. Alternatives Carried Forward.....	14
No-Build Alternative.....	14
Ability to Meet Needs.....	15
Build Alternative	15
Ability to Meet Needs.....	17
c. Cost/Funding	20

III. Environmental Consequences

a. Socioeconomics	38
Population.....	38
Title VI and Environmental Justice	39
Limited English Proficiency	40
Community Facilities.....	40
b. Land Use	41
Spotsylvania County	41
City of Fredericksburg	41
Stafford County	41
c. Parks and Recreational Facilities.....	41
d. Section 4(f) Resources.....	42
e. Right of Way and Relocation.....	43
f. Natural Resources.....	43
Waters of the United States, including Wetlands	43
Water Quality	44
FEMA Floodplains.....	45
Threatened and Endangered Species.....	45
g. Historic Properties	45
Archaeological Sites.....	45
Architectural Resources.....	46
Further Consultation	46
h. Air Quality	47
i. Noise.....	47
j. Hazardous Materials Sites of Potential Concern ...	48
k. Indirect and Cumulative Effects	48
Indirect Effects	48
Cumulative Effects	50
l. Construction	51
Late Discoveries	51
Water Quality	51
Air	52
Noise.....	52
Solid Waste and Hazardous Materials.....	52

IV. Comments and Coordination

a. Agency Coordination	53
b. Public Involvement	53



List of Tables

Table I.1: 2013 Existing Conditions Average Daily Traffic Volumes.....	8
Table I.2: 2013 Existing Conditions Levels of Service.....	8
Table I.3: Crash Data Types in the Project Area.....	10
Table I.4: Crash Data in the Project Area, 2010-2012	11
Table I.5: Projected Growth and Resulting 2040 No-Build Conditions	12
Table I.6: 2040 No-Build Conditions Levels of Service	13

Table II.1: Project Study Area Traffic Volumes for General Purpose Lanes.....	15
Table II.2: Project Study Area Levels of Service.....	17

Table III.1: Environmental Resource/Issue Summary	21
Table III.2: Summary of Potential Impacts.....	37
Table III.3: Total Population Over Time	38
Table III.4: 2010 Demographic Data.....	38
Table III.5: Community Facilities	40
Table III.6: Section 4(f) Resources.....	42
Table III.7: Right of Way and Property Impacts	43
Table III.8: Potential Relocations	43

List of Figures

Figure I.1: Study Area Map	5
Figure I.2: Project Area Growth and Development	9
Figure II.1: Proposed Build Alternative Map.....	16
Figure II.2: Estimated Limits of Construction for the I-95 Exit 133 (US 17 Interchange)	18
Figure II.3: Estimated Limits of Construction for the I-95 Exit 130 (VA 3 Interchange).....	19
Figure III.1: Environmental Justice Populations.....	25
Figure III.2: Socioeconomic and Community Resources.....	26
Figure III.3: Potential Right of Way Impacts.....	28
Figure III.4: Natural Resources	30
Figure III.5: Archaeology Sites	32
Figure III.6: Architecture Sites.....	34
Figure III.7: Preliminary Noise Barrier Analysis	36
Figure III.8: Hazardous Materials Sites of Potential Concern.....	49

Appendices

Appendix A: New Interstate Access Request Letter from FHWA dated April 28, 2011	54
Appendix B: Bridge Memorandum	59
Appendix C: Section 4(f) Memorandum	73

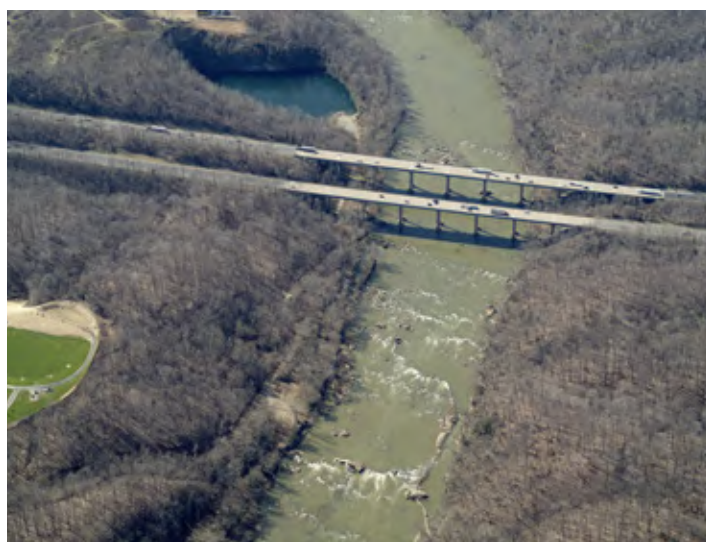
I: PURPOSE AND NEED

A. STUDY AREA

The Virginia Department of Transportation (VDOT), in cooperation with the Federal Highway Administration (FHWA), is evaluating alternatives and the potential environmental consequences of the Rappahannock River Crossing (RRC) project, located in Spotsylvania County, Stafford County and the City of Fredericksburg, as shown on **Figure I.1**. The project proposes improvements along an approximate three-mile section of the Interstate 95 (I-95) corridor, from the VA 3 Interchange (Exit 130) to just north of the US 17 Interchange (Exit 133).

Existing I-95 through the study area has three general-purpose travel lanes in both the northbound and southbound directions, with acceleration and deceleration lanes at the on and off-ramps of the VA 3 and US 17 Interchanges. At the US 17 Interchange, in the northbound direction, the general-purpose lanes are supplemented by a one-lane collector-distributor roadway (with an additional lane between the loop ramps). In the southbound direction, just south of the Rappahannock River, there are existing on and off-ramps that serve the Fredericksburg Safety Rest Area/Welcome Center. VA 3 is a primary route that is mostly six lanes through the study area vicinity, with additional turn lanes at intersections. US 17 is a primary route that is collocated with the six-lane I-95 and separates at Exit 133 as Warrenton Road, a four-lane divided highway.¹

Commercial and retail uses exist adjacent to the entire study area, in the areas surrounding the VA 3 and US 17 Interchanges. These areas host many hotels, retail shopping and restaurants, most notably the Central Park/Celebrate Virginia South complex. Residential areas located along I-95, both to the east and west of the study area, include the Preserve at Smith Run, Curtis Estates, Heritage Park, Central Park Townhomes, Central Park, Briscoe Lane and Noble Way. Daily commuter traffic from the region accesses I-95 at both the VA 3 and US 17 interchanges in order to reach the Washington, D.C. business and military installations to the north and the Richmond-Petersburg areas to the south.



¹Although travel on US 17 can be considered eastbound and westbound in addition to northbound and southbound because it is collocated with I-95 northbound and southbound, it will be referenced as eastbound and westbound for the purposes of this Environmental Assessment.

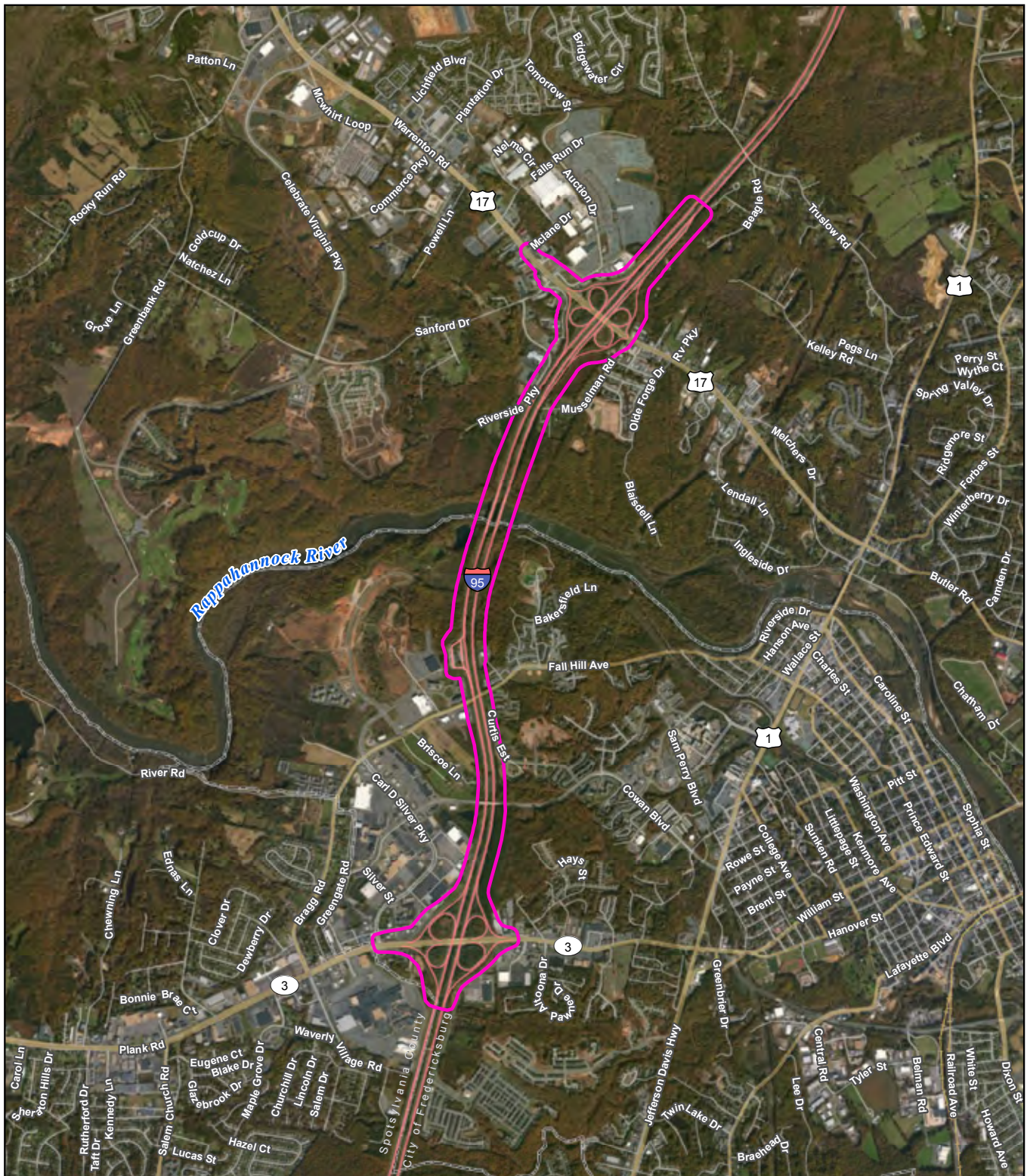
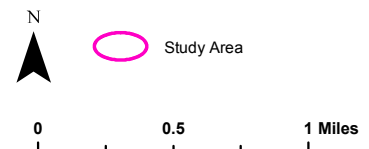


Figure I.1
Study Area Map
I-95 Rappahannock River Crossing

VDOT Projects: 0095-111-259, P101; UPC 101595
0095-111-270, P101; UPC 105510

Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia
(Source: Esri & Digital Globe; 2013)



B. HISTORY

1983 – 1985. I-95 was widened from four to six lanes in Caroline, Spotsylvania and Stafford Counties and the City of Fredericksburg.

2000 – 2002. Studies identify potential improvements to relieve congestion in the I-95 corridor in the greater Fredericksburg area, including the *Draft I-95 Interchange Justification Report* (VDOT, March 2000); *Outer Connector Northwest Quadrant Environmental Impact Statement* (VDOT, 2001); *I-95 Collector/Distributor Access Feasibility Study* (VDOT, 2002); and the *I-95 HOV Feasibility Study* (VDOT, 2002).

January 2009. The Fredericksburg Area Metropolitan Planning Organization (FAMPO) adopts the *2035 Constrained Long Range Plan* (CLRP), which includes funding for study, design, right-of-way, and partial construction of new I-95 access near the Fredericksburg Safety Rest Area/Welcome Center in the City of Fredericksburg, along with construction of a new tolled parkway to serve commuters and commercial center customers.

April 2009. The Virginia General Assembly creates the George Washington Toll Road Authority (GWTRA) for the purpose of supplementing public finances to fund construction of new I-95 access and a tolled parkway.

October 2010. The GWTRA and VDOT complete the *I-95 Access Study and Interchange Justification Report*, which identified a preferred alternative that includes: the construction of a new four to six-lane limited access connector road that would extend approximately four miles; a new interchange (three access points); and improvements on I-95 between and within the VA 3 and US 17 Interchanges to counterbalance the negative effects of the new access points.

April 2011. FHWA concurred that a proposed new access point on I-95 between VA 3 and the Rappahannock River as identified in the October 2010 *I-95 Access Study* is acceptable as conditioned in the April 28, 2011, FHWA approval letter. See Appendix A for a copy of the letter.

May 2011 (Amended February 2014). This Rappahannock River Crossing (RRC) Project was requested by the City of Fredericksburg and is included in the FAMPO Fiscal Year 2012-2015 Transportation Improvement Program.

January 2012. The Spotsylvania County Board of Supervisors passed a resolution indicating withdrawal of support for the proposed four- to six-lane limited access connector road because of the environmental, historical, conservation-related, cultural and quality-of-life concerns. The resolution further stated that the board will continue to support VDOT in seeking alternative solutions to alleviating traffic congestion on I-95 and the VA 3 corridor, including the funding of other elements within the project to include I-95 bridge additions over the Rappahannock River and improvements to the VA 3 interchange.

April 2013. The RRC project is included in the FAMPO *2040 Long Range Transportation Plan*, adopted April 15, 2013.

June 2013. The RRC project is programmed in the Fiscal Year 2014-2019 VDOT Six-Year Improvement Program (SYIP). The *I-95 Interchange Modification Report* (IMR), *Improvements to I-95 between Exit 133 and Exit 130*, is initiated by VDOT.

November 2013. FAMPO Resolution 13-33, signed November 18, 2013, transferred additional funds to the RRC project to complete the IMR and environmental studies. Preliminary Engineering and Right of Way are also funded for the project.

June 2014. The RRC project funding is modified in the Fiscal Year 2015-2020 VDOT SYIP. The project and project funding is divided into two projects, one for southbound and a separate for northbound.

November 2014. The Revised Final Fiscal Year 2015-2020 VDOT SYIP is published which reduces the funding programmed for the two (southbound and northbound) RRC projects.

March 2015. The *I-95 IMR, Improvements to I-95 between Exit 133 and Exit 130*, is completed by VDOT and pending approval.

April 2015. The draft Fiscal Year 2016-2021 VDOT SYIP is published, which shows preliminary engineering funded for the southbound direction.

C. NEEDS – EXISTING CONDITIONS

Capacity and Mobility

As shown on **Figure I.2**, data compiled by FAMPO shows a more than 400% increase in population since 1970 in the George Washington Region, which includes the City of Fredericksburg and the counties of Caroline, King George, Spotsylvania, and Stafford, making it the fastest growing region in Virginia since 1980 when its growth rate surpassed that of Northern Virginia. The region as a whole has grown by nearly 36% since 2000, and most of that growth has taken place in Stafford and Spotsylvania counties.²

While the region serves as a bedroom community for the greater Washington, D.C., and Richmond-Petersburg areas, the number of jobs in the George Washington Region has increased in the last decade. In 2000, there were 97,424 jobs in the region and, despite the economic downturn in 2008/2009, the region's employment grew to more than 149,500 jobs in 2010. This is an overall increase of 54%, averaging 5% growth a year.³ The growth in the region combined with the travel patterns of its workforce, which exhibit a high commuting exchange with the greater Washington, D.C., business and military community to the north and the Richmond-Petersburg metropolitan area to the south, has led to increased traffic volumes and congestion on the roadway network.⁴

In addition to traffic traveling through the area en route to destinations north and south, the region is serving as a destination as well. Residential communities have been constructed around the VA 3 and US 17 corridors. The proposed project is partially located within two Land Use Planning Areas as designated by the Fredericksburg Comprehensive Plan: Celebrate Virginia and Central Park. Together, Celebrate Virginia and Central Park make up the 2,400-acre mega-development spanning Stafford County, the Rappahannock River, and the City of Fredericksburg⁵ (see **Figure I.2**).

The existing land use for the Celebrate Virginia Land Use Planning Area is composed of predominately commercial-zoned parcels, containing the Celebrate Virginia tourism development. This portion of the area includes hotels, a conference center, a potential slavery museum site, and numerous retail and service oriented businesses. In addition to the Celebrate Virginia development, a 129-acre conservation easement also exists to preserve Civil War resources and to screen development viewable from the Rappahannock River.

In addition, a new minor league baseball stadium and related fields, facilities, and parking areas are being considered by the City of Fredericksburg within this Land Use Planning Area.⁶ Recommendations in the Fredericksburg Comprehensive Plan state that the Celebrate Virginia Land Use Planning Area should function as a visitor destination, attracting outside visitors to the City of Fredericksburg. To attract visitors to the area, the Comprehensive Plan promotes improving access to the area from I-95 and facilitating private development within existing infrastructure capacity while simultaneously preserving the historical and natural resources of the area. The Central Park Land Use Planning Area is a 310-acre retail and office space complex. The Central Park complex is the major retail destination within Fredericksburg and accounts for approximately 40% of the city's tax income.⁷ Across VA 3 from Central Park is the older Spotsylvania Mall, which has undergone extensive renovation to become the Spotsylvania Towne Centre.⁸



² 2040 FAMPO Long Range Transportation Plan, Chapter 3: Demographic and Socioeconomic Trends and Projections, Adopted April 15, 2013.

³ 2040 FAMPO Long Range Transportation Plan, Chapter 3: Demographic and Socioeconomic Trends and Projections, Adopted April 15, 2013.

⁴ 2040 FAMPO Long Range Transportation Plan, Chapter 4: Connecting Land Use and Transportation, Adopted April 15, 2013.

⁵ I-95 Interchange Modification Report, Improvements to I-95 between Exit 133 and Exit 130, Chapter 2: Existing Conditions, March 26, 2015.

⁶ Fredericksburg Comprehensive Plan, Fredericksburg, Virginia, Chapter 7: Suburban Business Districts, Adopted September 25, 2007.

⁷ I-95 Interchange Modification Report, Improvements to I-95 between Exit 133 and Exit 130, Chapter 2: Existing Conditions, March 26, 2015.

⁸ When?opoly, February 21, 2009. http://fredericksburg.com/News/FLS/2009/022009/02212009/438617/index_html?page=6, Accessed June 5, 2014.

The project study area includes a small portion of Spotsylvania County, specifically near the intersection of VA 3/Bragg Road. This area falls within Spotsylvania's Primary Settlement District, according to its Comprehensive Plan. The Primary Settlement District is where most of the development in the county has occurred in recent decades and is projected to accommodate the majority of future growth. The Primary Settlement District is located along two major transportation corridors, Interstate 95 and VA 3, and contains nearly all of the commercial, office and industrial uses located in Spotsylvania, in addition to residential subdivisions.⁹

The section of the study area north of the Rappahannock River to the I-95/US 17 interchange is located in Stafford County. According to the Stafford County Land Use Plan, the goal is to direct growth along major transportation and utility corridors. As a result, Stafford County employs the growth management technique of defining Urban Service Areas, which dictate the land areas that may be served by public water and sewer lines. Due to its proximity with US 17 and Interstate 95, much of the project area falls within Stafford County's Urban Service Area.¹⁰ Specifically, the project area is within the Southern Gateway Redevelopment Area, as identified in the *Stafford County Comprehensive Plan 2010-2013* and shown in **Figure I.2**. The area is currently a mix of low-density retail and residential land uses. Combining the commercial traffic, particularly from the retail areas, with local traffic destined for residential communities within the surrounding region has exacerbated congestion issues within the study area.¹¹

As a result of the growth in the region, combined with commuting patterns to and from Washington, D.C., existing travel demand has exceeded the capacity of I-95 and its interchanges with VA 3 and US 17. Existing 2013 traffic volumes are shown in **Table I.1**, which shows higher I-95 mainline volumes between the VA 3 and US 17 interchanges, as compared to north and south of the interchanges. According to the IMR, large volumes of local traffic make a horseshoe movement traveling either east along VA 3 to I-95 north, then west along US 17 heading north towards Warrenton or the traffic follows the reverse movement towards Spotsylvania County. During the peak hours, up to 20-24% of the traffic utilizing the VA 3 and US 17 ramps is making this horseshoe movement.¹²

The issues due to high traffic volumes on I-95 are compounded with heavy weaving and merging volumes within the study area, which decrease corridor efficiency and mobility, thus negatively impacting the Level of Service (LOS).¹³ **Table I.2** indicates LOS for the I-95 mainline and ramps within the study area, as shown in the IMR. Northbound AM Peak Hour and Southbound PM Peak Hour traffic creates lower LOS, which is indicative of worsening traffic conditions and increased congestion. The interchange ramps have movements that experience a LOS F, which indicates that the traffic conditions are at their worst, with the highest volumes and substandard diverge, weave and/or merge conditions.

Table I.1: 2013 Existing Conditions Average Daily Traffic Volumes

ROADWAY/LOCATION	NORTHBOUND	SOUTHBOUND	TOTAL
I-95 – South of Exit 130 (VA 3)	58,000	57,100	115,100
I-95 – within the Project Corridor (between Exits 130 and 133)	76,800	75,800	152,600
I-95 – North of Exit 133 (US 17)	68,300	66,400	134,700

Source: *I-95 Interchange Modification Report*, Volume I, March 26, 2015: Table 2-3

Table I.2: 2013 Existing Conditions Levels of Service

	ROADWAY/LOCATION	NORTHBOUND		SOUTHBOUND	
		AM PEAK HOUR	PM PEAK HOUR	AM PEAK HOUR	PM PEAK HOUR
MAINLINE	I-95 – South of Exit 130 (VA 3)	C	C	B	C
	I-95 – within the Project Corridor (between Exits 130 and 133)	E	C	B	F
	I-95 – North of Exit 133 (US 17)	E	C	B	E
RAMPS*	Exit 130 (VA 3) Interchange Ramps	F	C	C	F
	Exit 133 (US 17) Interchange Ramps	F	C	B	F

Source: *I-95 Interchange Modification Report*, Volume II, March 26, 2015: Figure 2-7

* Indicates worst case LOS for at least one of the Diverge/Weave/Merge movements shown in the IMR

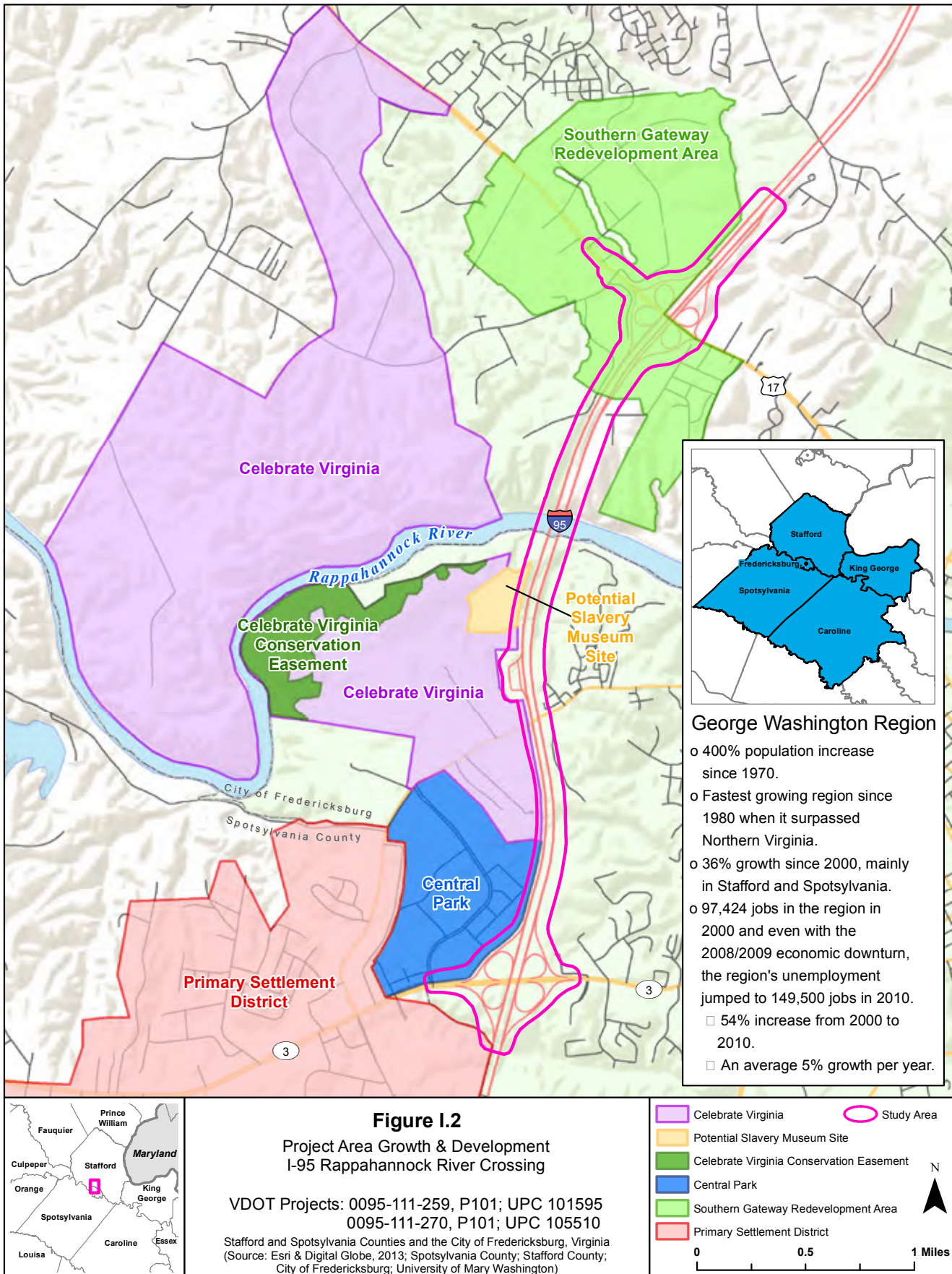
⁹ *Spotsylvania County Comprehensive Plan*, Spotsylvania, Virginia, Adopted November 14, 2013.

¹⁰ *Comprehensive Plan 2010 - 2030*, Stafford County, Virginia, Chapter 3: The Land Use Plan, December 14, 2010.

¹¹ *Comprehensive Plan 2010 - 2030*, Stafford County, Virginia, Chapter 3: The Land Use Plan, December 14, 2010.

¹² *I-95 Interchange Modification Report, Improvements to I-95 between Exit 133 and Exit 130*, Chapter 2: Existing Conditions, March 26, 2015.

¹³ *I-95 Interchange Modification Report, Improvements to I-95 between Exit 133 and Exit 130*, Chapter 2: Existing Conditions, March 26, 2015.



Safety

In addition to the traffic study and congestion evaluation conducted during the IMR, a safety analysis was performed for the study area. In order to evaluate safety concerns, VDOT crash data was analyzed for the area of I-95 between VA 3 and US 17, which is shown in **Tables I.3 and I.4**. As outlined in **Table I.3**, there were 1,180 crashes during the three most recent years studied (2010-2012), which is 68% more than the 704 crashes observed during the previously studied time period (2005-2008).

High traffic volumes on I-95 can cause difficult lane changes for motorists, specifically due to the heavy weaving and merging volumes between the VA 3 and US 17 interchanges. Combining the high local traffic volumes with the high volumes of through traffic on I-95 causes multiple conflict points for vehicles, which is producing above average crash rates in the corridor, as later discussed and as indicated in **Table I.4**. **Table I.3** also outlines

statistics of crashes by crash type. Crashes due to lengthy traffic queues resulting in stop and go traffic are often rear end collisions, which account for 603 of the 1,180 total crashes (51%), while crashes due to changing lanes and merging with traffic are often angle and sideswipe (same direction) conditions, which account for 327 of the 1,180 total crashes (28%). Although the percentage of rear end crashes has not changed since the 2005-2008 time period, the percentage of angle and sideswipe (same direction) has increased from 23% of the total crashes in 2005-2008 to 28% of the total in 2010-2012.¹⁴

As detailed in the IMR, during the most recent study period for crash data (2010-2012), the VDOT Crash Database indicates that 154 of the total crashes (25%) resulted in vehicle occupant injury and four crashes led to vehicle occupant fatalities. The reported crashes were also analyzed by the time of day of each

Table I.3: Crash Data Types in the Project Area

TYPE	2010-2012					2005-2008
	I-95 NB	I-95 SB	I-95 SB	VA 3 INTERCHANGE AREA	TOTAL PERCENT	TOTAL PERCENT
Rear End	155	144	102	202	51%	51%
Angle	43	24	32	77	15%	3%
Head On	1	0	0	0	<1%	0%
Sideswipe- Same Direction	42	43	30	36	13%	20%
Sideswipe- Opposite Direction	0	1	1	1	<1%	0%
Fixed Object- In Road	4	2	1	2	1%	2%
Train	0	0	0	0	0%	0%
Non-Collision	6	12	1	7	2%	3%
Fixed Object- Off Road	65	53	15	40	15%	17%
Deer	10	10	1	1	2%	3%
Other Animal	0	0	0	0	0%	0%
Pedestrian	0	0	4	2	1%	1%
Motorcyclist	1	0	1	0	<1%	0%
Backed Into	0	0	0	0	0%	0%
Miscellaneous or Other	2	1	2	3	1%	0%
Total Crashes	329	290	190	371	1,180	704

Source: *I-95 Interchange Modification Report*, Volume I, March 26, 2015; Table 2-9; VDOT Crash Database

¹⁴ *Lane Change/Merge Crashes: Problem Size Assessment and Statistical Description*, National Highway Traffic Safety Administration, January 1994, http://ntl.bts.gov/lib/jpodocs/repts_te/420.pdf, Accessed April 28, 2014.

occurrence. The majority of the crashes occurred during the AM and PM peak periods, when the traffic volumes are at their highest and operating conditions are at their poorest. Ten percent of all crashes occurred between 5:00 p.m. and 6:00 p.m.

The 2010-2012 crash rates of the roadway segments within the study area were analyzed and compared to 2012 statewide averages for interstates and primary roadways. Based on the most recent published VDOT Average Crash Rates (2012), the statewide average crash rate for interstates was 72 crashes per 100-Million Vehicle Miles Traveled (VMT) and for primary roadways the statewide average was 108 crashes per 100-Million VMT.¹⁵ All of the five roadway segments shown in **Table I.4** are currently operating with a crash rate above the statewide average for that roadway type. As shown, the interchanges have the highest crash rates with the VA 3 and US 17 interchanges having crash rates of 379% and 239% greater than the statewide average.



Table I.4: Crash Data in the Project Area, 2010-2012

ROADWAY SEGMENT FROM/TO		SEGMENT LENGTH (MILES)	AVERAGE ANNUAL CRASH TOTAL	2011 AVERAGE DAILY TRAFFIC (ADT)	CRASHES PER 100-MILLION VEHICLE MILES TRAVELED	PERCENT GREATER THAN STATEWIDE AVERAGE
VA 3 – Interchange Area	Gateway Boulevard to Central Park Boulevard	1.09	124	60,300*	517	379%
Interstate 95	Through the VA 3 Interchange	0.7	37	114,000**	127	76%
	VA 3 to US 17	2.3	93	141,500	78	8%
	Through the US 17 Interchange	1.2	47	102,100**	105	46%
US 17 – Interchange Area	Short Street to McLane Drive	0.91	63	51,800*	366	239%

Source: *I-95 Interchange Modification Report*, Volume I, March 26, 2015: Table 2-8; VDOT Crash Database, 2010-2012

* Average of ADT from east of the interchange and west of interchange on crossroad

**ADT located at I-95 mainline weave segment of Interchange

¹⁵ *I-95 Interchange Modification Report, Improvements to I-95 between Exit 133 and Exit 130*, Chapter 2: Existing Conditions, March 26, 2015.

D. NEEDS – FUTURE CONDITIONS

Capacity and Mobility

Growth and development within the study area is predicted to increase greatly according to FAMPO and the local governments in the region which will have an intense effect on the capacity and mobility of the I-95 corridor. Forecasts compiled by FAMPO show continuing population growth in the George Washington Region, with an increase by the year 2040 from the current 315,000 to 617,000 residents, with the majority of growth projected in the areas immediately adjacent to and surrounding I-95 in Stafford and Spotsylvania counties and the City of Fredericksburg. Employment in this same area is also anticipated to grow from 149,900 in 2010 to 182,300 in 2020 and 253,240 by 2040, which is a 69% increase.¹⁶

The government sector is one of the most prominent employers in the George Washington Region. The 2040 FAMPO Long Range Transportation Plan illustrates this point by indicating that the U.S. Department of Defense and Stafford County Schools are the first and second largest employers in the region. The number of government jobs is expected to increase as the federal government continues to decentralize and open satellite offices in the George Washington Region. In addition, Washington, D.C., and Richmond are expected to continue expanding outward as companies find cheaper land on the fringes of the metropolitan areas to locate their offices. This will bring employment opportunities closer to the residents of the George Washington Region.¹⁷

In addition to commuting trips, congestion within the study area results from activity at the commercial and retail centers in the project area, most specifically the Central Park/Celebrate Virginia complexes. According to the *Fredericksburg Comprehensive Plan*, the City of Fredericksburg will continue to support this major commercial center to boost local employment opportunities and the local tax base. The development of the future Celebrate

Virginia South complex is expected to further augment the city's economic development potential by providing regional conference, hospitality and educational services.

According to both Stafford and Spotsylvania comprehensive plans, numerous areas within these counties are projected to experience substantial growth. Spotsylvania's 2008 Comprehensive Plan designates that any future growth should be higher density development. The plan promotes traditional neighborhood development, mixed-use development, residential infill development, and pedestrian paths. Similarly, the Stafford County Comprehensive Plan calls US 17 a major transportation hub and identified it as a place for economic development by taking advantage of the accessibility to I-95.

Overall, Stafford County anticipates greater growth and density in the US 17 Corridor. Future land use recommendations for this area include hotels and residential developments.¹⁸ The travel generated by this continuing growth will further increase traffic volumes on I-95, VA 3 and US 17 within the study area, further increasing congestion and decreasing mobility on these major area roadways.

During the preparation of the IMR, 2040 No-Build Conditions were forecasted by applying growth percentage rates to the 2013 Existing Conditions data. These linear growth rates were determined by VDOT engineers and planners using a combination of historic growth rates, FAMPO travel demand model output and professional judgment. Growth rates along the arterials varied to the east and west of the interchanges at both VA 3 and US 17. The 2040 No-Build forecasted volumes for I-95 are shown in **Table I.5**, which indicates that the study area is projected to experience an increase in traffic volumes of 44-52% by 2040.¹⁹

Table I.5: Projected Growth and Resulting 2040 No-Build Conditions

ROADWAY/LOCATION	2013 EXISTING CONDITIONS			AVERAGE ANNUAL GROWTH RATE		2040 NO-BUILD CONDITIONS (GENERAL PURPOSE LANES ONLY)			PERCENT INCREASE FROM 2013 TO 2040
	NB	SB	TOTAL*	NB	SB	NB	SB	TOTAL*	TOTAL
I-95 – South of Exit 130 (VA 3)	58,000	57,100	115,100	2.5%	2.5%	115,100	84,000	174,500	52%
I-95 – within the Project Corridor (between Exits 130 and 133)	76,800	75,800	152,600	2.3%*	2.1%*	116,200	109,800	226,000	48%
I-95 – North of Exit 133 (US 17)	68,300	66,400	134,700	2.1%*	2.1%*	101,100	92,900	194,000	44%

Source: *I-95 Interchange Modification Report*, Volume I, March 26, 2015: Table 3-9

* Calculated from resulting volumes of adding and subtracting Ramp ADT; rounded to the nearest 0.1%

¹⁶ 2040 FAMPO Long Range Transportation Plan, Chapter 3: Demographic and Socioeconomic Trends and Projections, Adopted April 15, 2013.

¹⁷ I-95 Interchange Modification Report, Improvements to I-95 between Exit 133 and Exit 130, Chapter 2: Existing Conditions, March 26, 2015.

¹⁸ Comprehensive Plan 2010 - 2030, Stafford County, Virginia, Chapter 3: The Land Use Plan, December 14, 2010.

¹⁹ I-95 Interchange Modification Report, Improvements to I-95 between Exit 133 and Exit 130, Chapter 3: Future Year Traffic & No-Build Alternative Analysis, March 26, 2015.

The projected increase in future traffic volumes in the project corridor would exacerbate the existing traffic conditions. As depicted in **Table I.6**, the 2040 No-Build Conditions LOS is expected to worsen when compared to the 2013 Existing Conditions data shown in Table I.2 because of the increased volumes resulting from anticipated future growth and development. Without improvement to the existing roadways, congestion, mobility and travel pattern efficiency will continue to worsen under projected 2040 volumes.

Safety

With the continued growth and development in the area combined with the projected 31-34% increase in future traffic volumes by 2040²⁰, safety concerns would continue to be an issue and would be exacerbated each year. Crash rates would likely continue to increase, and the number of occupant injuries and fatalities could grow well beyond existing numbers without further improvements to the existing roadways.

E. PURPOSE/SUMMARY

This project was initiated with the specific intent of improving local and through traffic conditions on I-95 between and within the VA 3 and US 17 interchanges and increasing access between I-95 and key residential and commercial areas in the project area, both north and south of the Rappahannock River. Based on the existing and future needs, the purpose of the proposed project is to:

- Improve the LOS on I-95 by providing additional capacity and improving mobility, and
- Improve safety by reducing conflict points between local and through traffic.

Table I.6: 2040 No-Build Conditions Levels of Service

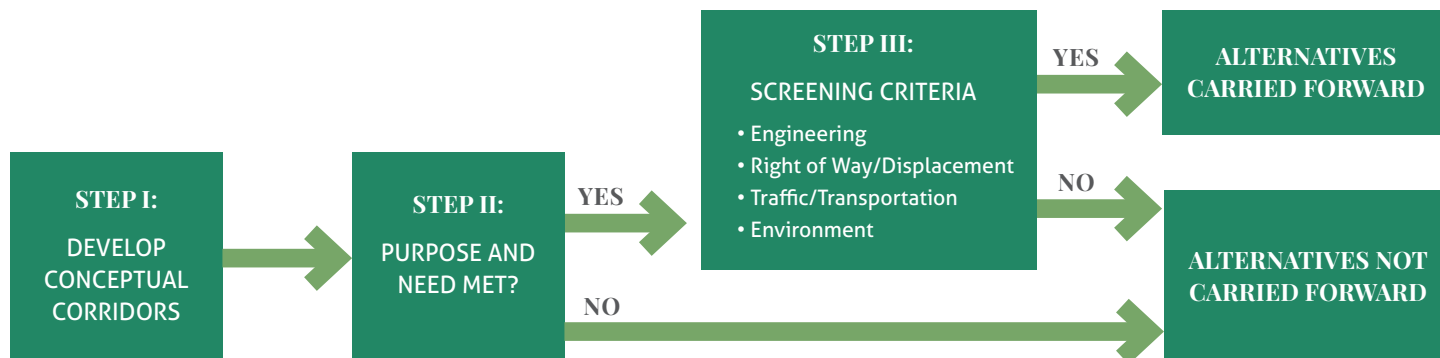
	ROADWAY/LOCATION	NORTHBOUND		SOUTHBOUND	
		AM PEAK HOUR	PM PEAK HOUR	AM PEAK HOUR	PM PEAK HOUR
MAINLINE	I-95 – South of Exit 130 (VA 3)	C	E	C	D
	I-95 – within the Project Corridor (between Exits 130 and 133)	F	F	D	F
	I-95 – North of Exit 133 (US 17)	E	E	D	F
RAMPS*	Exit 130 (VA 3) Interchange Ramps	F	F	D	F
	Exit 133 (US 17) Interchange Ramps	F	F	D	F

Source: *I-95 Interchange Modification Report*, Volume II, March 26, 2015: Figures 3-5

* Indicates worst case LOS for at least one of the Diverge/Weave/Merge movements shown in the IMR

²⁰ *I-95 Interchange Modification Report, Improvements to I-95 between Exit 133 and Exit 130*, Chapter 3: Future Year Traffic & No-Build Alternative Analysis, March 26, 2015.

II. ALTERNATIVES CONSIDERED



A. ALTERNATIVES DEVELOPMENT AND SCREENING PROCESS

This section summarizes the process that was used to develop and screen alternatives and is illustrated in the diagram below. The March 26, 2015 *I-95 Interchange Modification Report (IMR)*, *Improvements to I-95 between Exit 133 and Exit 130* formed the basis for the alternatives development and screening process. The IMR is incorporated by reference in this Environmental Assessment (EA) and identifies a "Preferred Alternative," consistent with the Build Alternative presented in this EA. The screening process performed for this EA considered a full range of alternatives, including those presented in the I-95 IMR and previous studies that could potentially meet the identified transportation needs (as defined in the **Purpose and Need**). These alternatives included the following:

- No-Build Alternative
- Transportation System Management (TSM) Alternative
- Local Street Network Improvements Only Alternative
- Various Build Alternatives, which primarily focused on alternatives within the interchange areas at Exit 133 and Exit 130.

The key factors that were taken into consideration in the evaluation included, but were not limited to:

1. Meeting the Purpose and Need
2. Environmental Constraints
3. Existing and Planned Development
4. 2040 Traffic Volumes and Operations
5. Safety Considerations
6. Funding Constraints
7. Professional Judgment of the Steering Committee

With the exception of the No-Build Alternative, alternatives that would not meet the stated purpose and need are not considered reasonable and were not carried forward for detailed evaluation in this EA.

B. ALTERNATIVES CARRIED FORWARD

Detailed traffic analyses were conducted on the No-Build and Build Alternatives as part of the I-95 IMR. Both Opening Year (2020) and Design/Future Year (2040) traffic volumes and performance levels were developed using the latest Fredericksburg Area Metropolitan Planning Organization (FAMPO) regional travel demand model in coordination with VDOT, FHWA and FAMPO. As shown in **Table II.1**, traffic volumes on I-95 are projected to increase within the project corridor, south of VA 3 and north of US 17 when compared to the 2040 No-Build condition.

The following describes the two alternatives under consideration and studied for this EA: the No-Build Alternative and the Build Alternative.

No-Build Alternative

The No-Build Alternative serves as a baseline of conditions for the comparison of the Build Alternative. The No-Build Alternative represents no modifications to the interstate or arterial roadway system other than the already planned and programmed improvements identified in the FAMPO 2040 Constrained Long-Range Plan and/or VDOT's Fiscal Year 2014-2019 Six-Year Improvement Program (SYIP). However, it would allow for short-term restoration types of activities (safety and maintenance improvements, etc.) that maintain continuing operation of the existing interstate facility.

Ability to Meet Needs

As shown in the I-95 IMR, under the No-Build Alternative, the existing interchanges and/or local roads and streets in the corridor cannot provide a satisfactory level of service (LOS) to accommodate the weekday AM/PM peak hour design year traffic demands for 2040, while at the same time providing safe and adequate access. There is oversaturation on VA 3, I-95 and US 17 creating bottlenecks that increase congestion in the region. As stated in the **Purpose and Need**, there is a need to explore alternatives that add capacity to the I-95 corridor and reduce congestion on VA 3 and I-95. Because the No-Build Alternative does not add capacity and reduce congestion within the project corridor, it does not meet the purpose and need for this project.

Build Alternative

The Build Alternative is based on the preferred alternative identified and evaluated in the I-95 IMR and represents a set of improvement concepts that form a stand-alone solution to the identified needs within the study corridor. Although a conceptual design plan is presented for the Build Alternative, the study corridor encompasses sufficient area to accommodate future refinements and modifications to the design evaluated and depicted in the I-95 IMR and in this EA. This approach provides an assessment of the potential impacts while providing flexibility during final design with respect to the general project location and design features. VDOT and FAMPO endorse this alternative. This alternative is being advanced in this EA because it provides the best and most cost effective solution for meeting the project's purpose and need while maximizing the benefits and minimizing the impacts.

As shown in **Figure II.1** and in the figures in Chapter 6 of the I-95 IMR, the Build Alternative includes new two-lane collector-distributor (C-D) roads parallel to I-95, outside of the mainline, in the northbound (NB) and southbound (SB) directions between Exit 130 (VA 3) and Exit 133 (US 17) interchanges. In the NB direction, the C-D road would start with traffic entering from VA 3 on the north side of the Exit 130 interchange and end on the south side of the Exit 133 interchange where traffic would either exit onto US 17 or merge with mainline I-95. In the SB direction, the C-D road would start with traffic from I-95 and US 17 merging on the south side of the Exit 133 interchange and end north of the Exit 130 interchange where traffic would either exit onto VA 3 or merge with mainline I-95. The C-D roads would cross the Rappahannock River on either separate bridge structures or on widened existing bridges. The Virginia Welcome Center (rest area) would be provided on- and off-ramps from the new I-95 SB C-D road. The proposed improvements to the US 17 interchange would require construction of braided ramps and flyovers in order to replace the cloverleaf configuration and eliminate the loop ramps onto I-95 in each direction. The proposed improvements to the VA 3 interchange would eliminate one loop ramp within the interchange and include the addition of through lanes, turn lanes and signals in order to improve traffic flow along VA 3, as shown in the figures in Chapter 6 of the I-95 IMR. The proposed braided ramps and C-D roads would reduce conflict points and reduce the large weaving volumes within the project corridor, thus contributing to safer operating conditions. **Figure II.2** depicts the potential limits of construction for the improvements at the US 17 interchange, while **Figure II.3** depicts the potential limits at the VA 3 interchange.

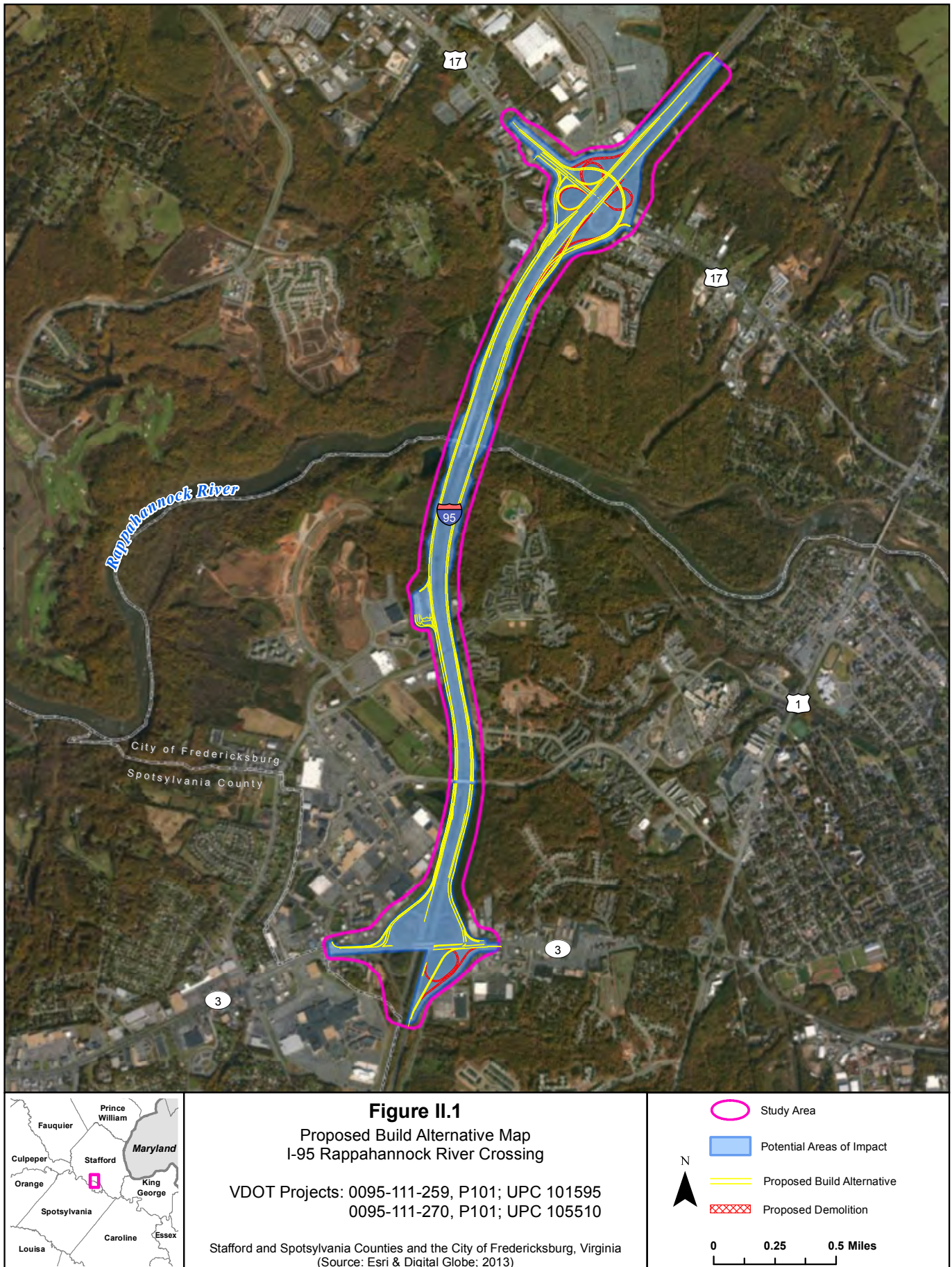
Table II.1: Project Study Area Traffic Volumes for General Purpose Lanes*

ROADWAY/LOCATION	2013 EXISTING CONDITIONS	2040 NO-BUILD CONDITIONS	2040 BUILD CONDITIONS
I-95 – South of Exit 130 (VA 3)	115,100	174,500	178,300
I-95 – within the Project Corridor (between Exits 130 and 133)	152,600	226,000	159,000
I-95 – North of Exit 133 (US 17)	134,700	194,000	203,800

Source: I-95 Interchange Modification Report, Volume I, March 26, 2015: Table 3-9, Table 6-6

* Conditions are for both northbound and southbound lanes

¹ FAMPO Resolution 14-01, February 10, 2014. http://www.fampo.gwregion.org/wp-content/uploads/2014/01/FAMPO-Resolution-14-01-I-95-Congestion-Relief_021014.pdf, Accessed May 28, 2015.



Ability to Meet Needs

As stated in the *Purpose and Need*, this project was initiated with the specific intent of improving local and through traffic conditions on I-95 between the VA 3 and US 17 interchanges and increasing access between I-95 and key residential and commercial areas in the project area, both north and south of the Rappahannock River. Based on the existing and future needs, the purpose of the proposed project is to:

- Improve the LOS on I-95 by providing additional capacity and improving mobility
- Improve safety by reducing conflict points between local and through traffic

As indicated earlier in this section and through the analyses performed for the I-95 IMR and for this EA, the Build Alternative would provide the best and most cost effective solution for meeting the project's purpose and need. Overall, the implementation of the Build Alternative would result in improvements in the LOS for NB and SB I-95 and at the Exit 130 (VA 3) and Exit 133 (VA 17) interchanges. Substantial improvements in operating conditions within the project limits are expected with the proposed improvements.

Capacity and Mobility

As detailed in the *I-95 IMR*, 2040 Build LOS analyses were performed for the Weekday AM / PM peak hours for NB and SB I-95 mainline segments and at ramp junctions (merge, diverge and weave) for the interchanges at Exits 130 and 133 in the study

area. The analyses show that as a result of the Build Alternative, there would be improved LOS for both NB and SB I-95 mainline segments within the study area and at the interchange ramp junctions when compared to the 2040 No-Build Conditions, as depicted in **Table II.2**.

With the Build Alternative in place, the following key LOS improvements are projected when compared to the No-Build conditions:

- The NB segment of I-95 within the study area is projected to improve from a LOS F to a LOS B in the AM peak and from a LOS F to a LOS D in the PM peak with 2040 conditions.
- The SB segment of I-95 within the study area is projected to improve from a LOS D to a LOS C in the AM peak and from a LOS F to a LOS D in the PM peak with 2040 conditions.
- The Exit 130 (VA 3) interchange NB ramps are projected to improve from a LOS F to a LOS C for the AM peak and from a LOS F to a LOS D in the PM peak.
- The Exit 130 (VA 3) interchange SB ramps are projected to improve from a LOS D to a LOS C for the AM peak and from a LOS F to a LOS D in the PM peak.
- The Exit 133 (US 17) interchange NB ramps are projected to stay at a LOS F in the AM peak and improve from a LOS F to a LOS D in the PM peak.
- The Exit 133 (US 17) interchange SB ramps are projected to improve from a LOS D to a LOS B in the AM peak and stay at a LOS F in the PM peak.

Table II.2: Project Study Area Levels of Service

	ROADWAY/LOCATION	NORTHBOUND						SOUTHBOUND					
		AM PEAK			PM PEAK			AM PEAK			PM PEAK		
		2013 Existing	2040 No-Build	2040 Build	2013 Existing	2040 No-Build	2040 Build	2013 Existing	2040 No-Build	2040 Build	2013 Existing	2040 No-Build	2040 Build
MAINLINE	I-95 – South of Exit 130 (VA 3)	C	C	C	C	E	E	B	C	C	D	D	E
	I-95 – within the Project Corridor (between Exits 130 and 133)	E	F	B	C	F	D	B	D	C	F	F	D
	I-95 – North of Exit 133 (US 17)	E	E	F	C	E	E	B	D	D	E	F	F
RAMPS*	Exit 130 (VA 3) Interchange Ramps	F	F	C	C	F	D	C	D	C	F	F	D
	Exit 133 (US 17) Interchange Ramps	F	F	F	C	F	D	B	D	B	F	F	F
C-D ROAD & RAMPS	I-95 C-D Road and Ramps to/from I-95 and Rest Area	N/A	N/A	F	N/A	N/A	C	N/A	N/A	B	N/A	N/A	D

Source: *I-95 Interchange Modification Report*, Volume II, March 26, 2015: Figure 2-7, Figure 3-5, Figure 6-11

* Indicates worst case LOS for at least one of the Diverge/Weave/Merge movements shown in the IMR



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**Figure II.2**

Estimated Limits of Construction
Exit 133: I-95 and U.S. Route 17 Interchange
I-95 Rappahannock River Crossing

VDOT Projects: 0095-111-259, P101; UPC 101595
0095-111-270, P101; UPC 105510

Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia
(Sources: Esri & DigitalGlobe, 2012)

- Estimated Limits of Construction
- Existing Right of Way
- Study Area

0 500
Feet








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Figure II.3
Estimated Limits of Construction
Exit 130: I-95 and VA Route 3 Interchange
I-95 Rappahannock River Crossing

VDOT Projects: 0095-111-259, P101; UPC 101595
0095-111-270, P101; UPC 105510
Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia
(Sources: Esri & DigitalGlobe, 2012)

-  Estimated Limits of Construction
-  Existing Right of Way
-  Study Area

0 500
Feet



Safety

In examining the needs to improve safety, the Build Alternative would add capacity to I-95 between VA 3 and US 17 in the form of additional C-D roads. The proposed braided ramps and C-D roads reduce conflict points and substantially reduce the large weaving volumes between Exit 130 (VA 3 interchange) and Exit 133 (US 17 interchange). The increase in capacity on I-95 and reduction in weaving volume would contribute to safer operating conditions when compared to the No-Build Conditions. Safer operating conditions include less stop-and-go traffic, lower vehicle density, and lower speed differential between free-flow travel and congested travel, which would reduce crashes and crash rates as compared to the No-Build Alternative.

The Build Alternative would not only allow for the benefit of added capacity, but also geometric improvements proposed at the VA 3 and US 17 interchanges. At the Exit 133 (US 17) interchange in the NB direction, the existing US 17 WB loop off-ramp at the C-D road weave area would be replaced by a flyover ramp, eliminating multiple weaves. In the SB direction, the existing weave at the US 17 interchange is eliminated by removing the loop on-ramp from US 17 WB to I-95 SB, providing only one on-ramp in the SB direction. At the Exit 130 (VA 3) interchange, the I-95 NB loop on-ramp from VA 3 EB would be replaced with a left turn onto the new I-95 NB C-D road. By replacing these existing ramps, traffic flow can move at higher speeds using modern design standards, which is expected to decrease crash rates.

C. COST/FUNDING

Planning level cost estimates were developed for the project. Due to funding commitments, the SB improvements are proposed to be advanced ahead of NB improvements. The estimated cost for the SB improvements (UPC 101595) is \$121.3 million. The SB improvements are funded for preliminary design in VDOT's Fiscal Year 2014-2019 SYIP. The cost for the NB improvements (UPC 105510) is estimated at \$152.0 million. Preliminary design is not currently funded for this project in VDOT's Fiscal Year 2014-2019 SYIP. The projects are to be evaluated and prioritized as required by law under House Bill 2.



III. ENVIRONMENTAL CONSEQUENCES

The potential environmental issues and concerns related to the Build Alternative are summarized in **Table III.1**. The potential impacts depicted are calculations within the Build Alternative's proposed cut and fill boundaries; however, impacts will be further analyzed in detail during the design phase of the project, once more information is known about a specific alignment, construction impacts, and stormwater management needs. Additional information on these resources can be found in the Technical Reports prepared for this project, including: the *Phase I/II Archaeological Survey*, *Architectural Management*

Summary, *Air Quality Analysis*, *Preliminary Noise Analysis Technical Report*, and *Natural Resources Technical Report*. The following tables summarize the resources identified along with the estimated impacts of the No-Build Alternative and Build Alternative. The No-Build Alternative serves as a baseline for the comparison of future conditions and impacts and it is not anticipated to impact any environmental resources.

Table III.1: Environmental Resource/Issue Summary

RESOURCE/ISSUE	REMARKS
Environmental Justice (EJ) Populations	Using current 2010 U.S. Census data, there are nine census block groups that fall within the study area, as depicted on Figure III.1 . Of the nine, five census block groups are considered EJ populations based on minority percentages and two are considered EJ populations based on income. The two low-income block groups also overlap with minority populations. This project includes three residential displacements located within an EJ census block group based on minority populations. See the Right of Way and Relocation and Title VI and Environmental Justice sections for further details. The Build Alternative would not impact community cohesion, accessibility, health, and safety concerns in the study area. The Build Alternative is also anticipated to positively affect regional economy and employment by decreasing congestion, increasing accessibility, and improving mobility and safety along I-95, VA 3 and US 17. Based on the analysis above, the project would not cause disproportionately high and adverse effects on minority or low-income populations in accordance with the provisions of E.O. 12898 and FHWA Order 6640.23. No further EJ analysis is required.
Community Facilities	There are two specialty schools, one non-profit community center, and two low-income housing facilities located within the project study area, listed in Table III.5 and shown on Figure III.2 - Maps 1 and 2 . The proposed project would be designed to avoid or minimize impacts to existing and proposed community facilities.
Land Use	This project is consistent with each locality's current land use and zoning policies, including specific guidelines for future land use. Please reference the Land Use section for additional information on existing land use.
Agriculture, Prime Farmland and Soils	Most of the project study area is located in an Urbanized Area (UA) identified by the U.S. Census Bureau and does not require coordination based on the Farmland Policy Protection Act (FPPA). According to Natural Resources Conservation Service (NRCS) mapping, there are approximately 6.2 acres of designated Prime Farmlands and 6.3 acres of designated Farmlands of Statewide Importance located within the areas to be potentially impacted by the Build Alternative. Although these areas are mapped as designated farmlands by NRCS, the United States Department of Agriculture (USDA) Harrisonburg, Virginia Office stated that due to the location of these farmlands and the fact the areas are 'committed to urban' use, these areas do not qualify under FPPA as Prime Farmland or Farmlands of Statewide Importance. Therefore, there are no farmland impacts associated with this project.
Forest Resources	There are approximately 116.8 acres of forested land within the study area. Impacts would consist of conversion of approximately 37.9 acres of forested land to either pavement or maintained herbaceous and shrub land.

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Table III.1: Environmental Resource/Issue Summary

RESOURCE/ISSUE	REMARKS
Agricultural/Forestal Districts	There are no Agricultural/Forestal Districts located within the project study area.
Parks and Recreation Areas	As shown on Figure III.2 - Maps 1 and 2 , there is one park, one City-owned parcel with recreational lands, three existing publicly owned trails and four planned publicly owned trails within the study area, in addition to multiple private trails. Minor impacts are anticipated at the City-owned parcel with recreational lands, Pool Pass Trail, Scout/Embry Dam/Rappahannock Canal Trail, and the proposed Cannon Ridge Ferry-Farm Trail. Please reference the Parks and Recreational Facilities section and Appendix C for additional information on the impacted facilities within the study area.
Open Space Easements	There are no Virginia Outdoors Foundation (VOF) easements located within the study area.
Visual/Scenic Byways and Scenic Rivers	VA 618 (River Road) is a scenic byway and headwaters of the Rappahannock River are designated as a scenic river by the Virginia Department of Conservation and Recreation (VDCR) and the National Park Service (NPS), shown on Figure III.2 - Maps 1 and 2 . Any impacts to the scenic river through the project study area would be minimal, because the area is already disturbed by the existing I-95 bridges.
Section 4(f) properties	As described in the Section 4(f) Resources section of this chapter, Section 4(f) resources within the study area include one park, one City-owned parcel with recreational lands, three existing publicly owned trails, four planned publicly owned trails within the study area (shown in Figure III.2 - Maps 1 and 2), and two National Register of Historic Places (NRHP) eligible historic properties: the Rappahannock Navigation System and Battle of Fredericksburg I, shown in Figure III.5 - Maps 1 and 2 and III.6 - Maps 1 and 2 . Minor impacts are anticipated at the City-owned parcel with recreational lands, Pool Pass Trail, Scout/Embry Dam/Rappahannock Canal Trail and the proposed Cannon Ridge Ferry-Farm Trail. Additionally, there are potential impacts to the Rappahannock Navigation System and Battle of Fredericksburg I, which are currently being evaluated and coordinated with the Virginia Department of Historic Resources (VDHR). A formal Section 106 effect determination for the project as a whole will be obtained from VDHR prior to completion of the National Environmental Policy Act (NEPA) process.
Section 6(f) Properties	Based on the NPS's Land and Water Conservation Fund (LWCF) database and VDCR, there are no Section 6(f) properties located within the study area.
Right of Way/Relocations	An estimated 174.5 total acres are within the study area, and based on the conceptual design approximately 32.7 acres are anticipated for acquisition, as further described in the Right of Way and Relocation section . There are 63 residences, one non-profit organization, and 108 commercial establishments within the study area; however, only three residential properties and five commercial properties are anticipated to be potentially relocated or displaced as a result of the project (Figure III.3 - Maps 1 and 2). The actual quantity of right of way necessary to implement the project would be identified during final design. Land and properties necessary for right of way would be acquired in accordance with the federal <i>Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970</i> , as amended.
Waters of the U.S., including Wetlands	There are four primary stream systems within the study area: the Rappahannock River, Hazel Run, Falls Run, and Fall Quarry Run. The wetland systems within the Build Alternative are located along the stream channels. As shown on Figure III.4 - Maps 1 and 2 , the potential Build Alternative impacts would be 2.4 acres of wetland impacts and 6,408 linear feet of stream impacts. See the Natural Resources Technical Report for additional details.

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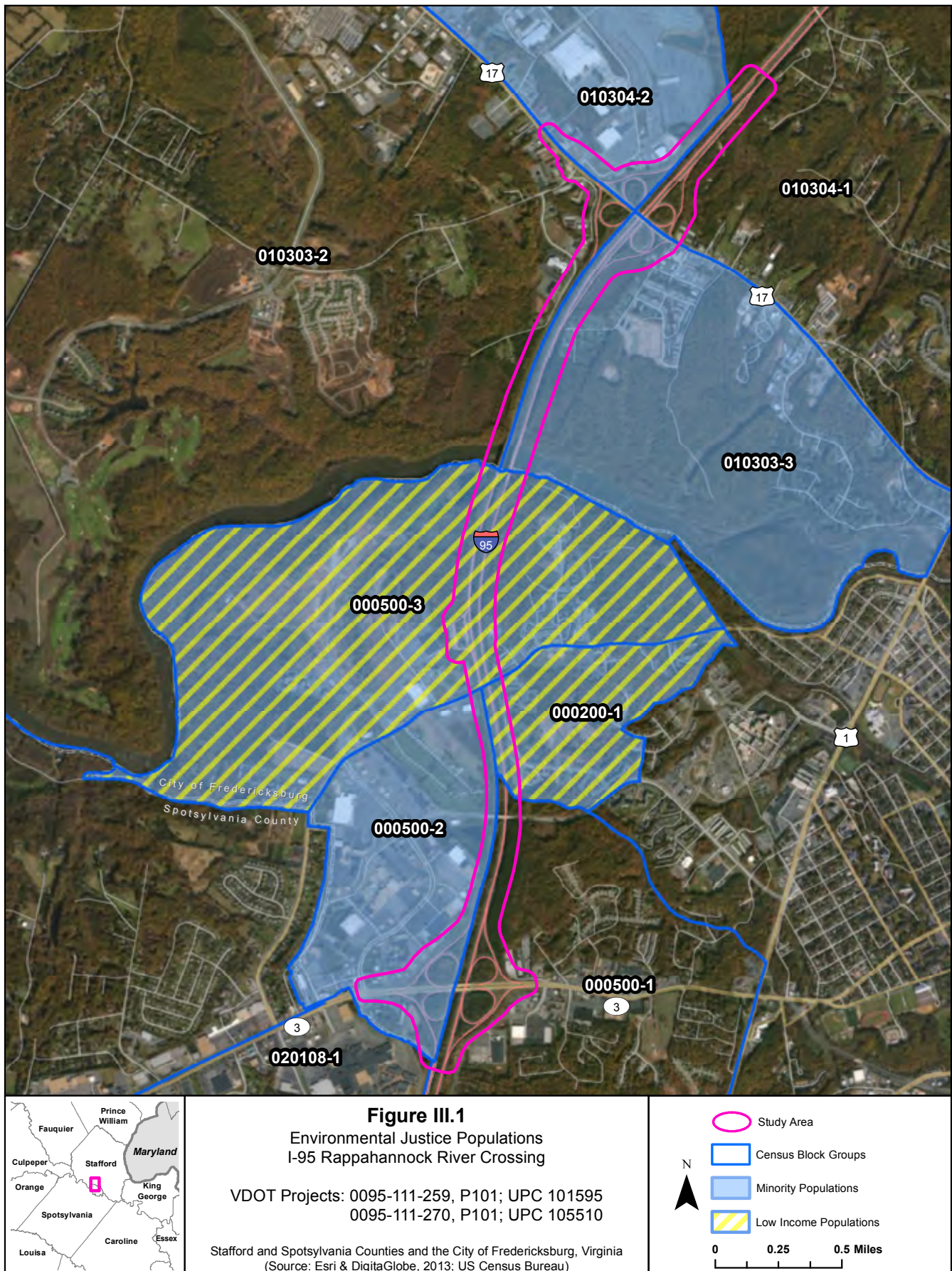
Table III.1: Environmental Resource/Issue Summary

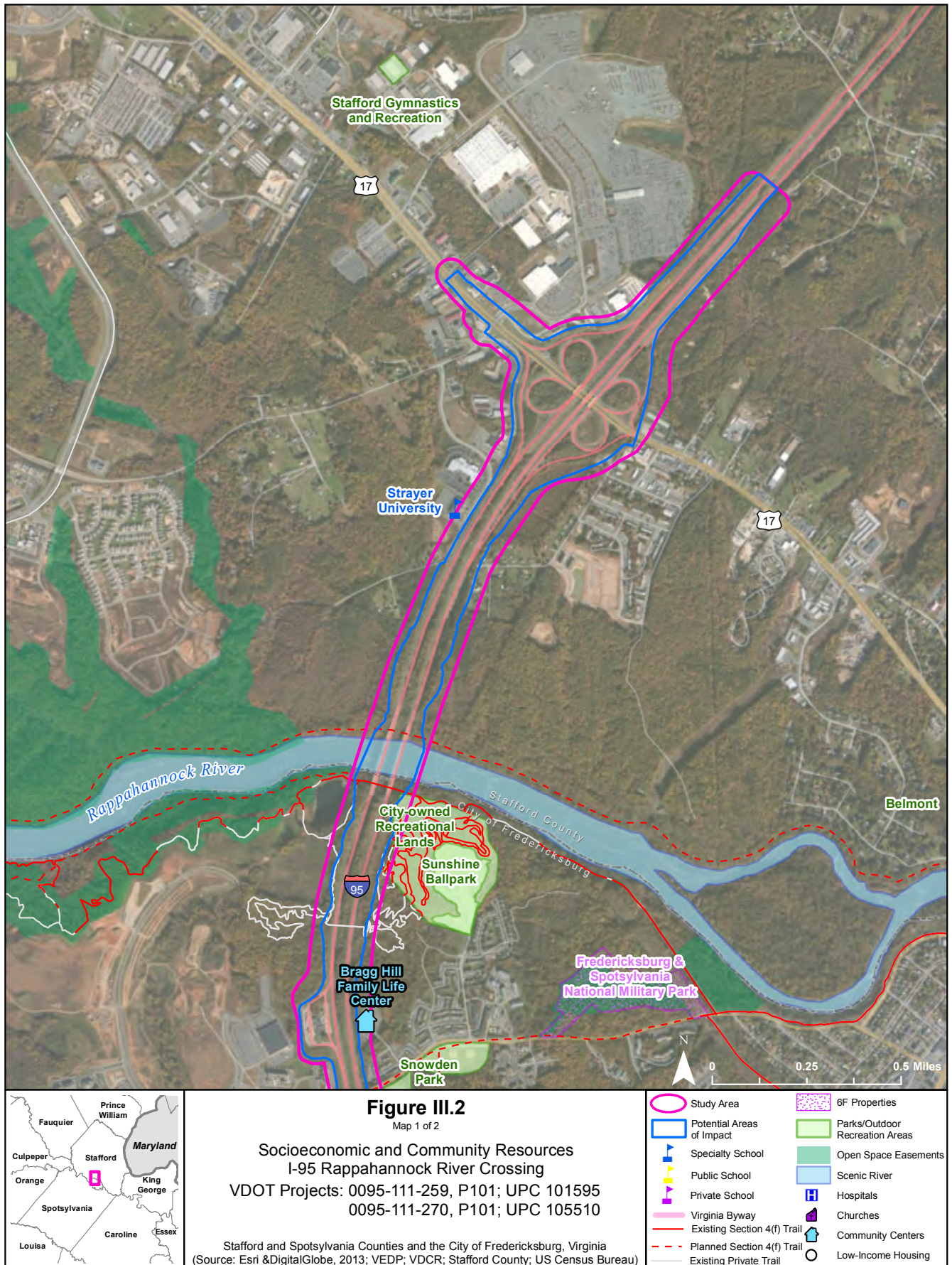
RESOURCE/ISSUE	REMARKS
Water Quality	A number of stream systems and other waterbodies, including reservoirs, in the lower Rappahannock River Basin have been listed as impaired by the Virginia Department of Environmental Quality (VDEQ). Impaired waters include a section of the Rappahannock River located approximately 1.5 miles from the study area, Falls Run within the study area, Claiborne Run 1.3 miles from the study area, and Hazel Run 0.7 miles from the study area. The project would require water quality permits, a stormwater management plan, and an erosion and sediment control plan. Adherence to the permit conditions and plans would minimize impacts to water quality. See the Natural Resources Technical Report for additional details.
Public Water Supplies	There are no public groundwater wells within a one-mile radius of the project site. Water flow from the project site drains into the Rappahannock River. There are no apparent impacts to public drinking water sources due to this project. See the Natural Resources Technical Report for additional details.
Floodplains	Based on the Federal Emergency Management Agency (FEMA) mapping, the Build Alternative crosses approximately 12.4 acres of the Rappahannock River 100-year floodplain and 0.99 acres of the Falls Run 100-year floodplain (Figure III.4 - Maps 1 and 2). During final design, a detailed hydraulic survey and study would evaluate specific effects on stormwater discharges and would adhere to applicable specifications ensuring that no substantial increases to the floodplain would occur.
Terrestrial and Aquatic Habitat and Wildlife	The most valuable terrestrial wildlife habitat in the study area is the forested land. Impacts to this resource would consist of the conversion of the forested land for purposes of transportation, as described in the Forest Resources section of this table. Aquatic habitats consist of wetlands, streams, and the Rappahannock River (Figure III.4 - Maps 1 and 2). Through the permitting process, impacts to these resources would be avoided and minimized to the greatest extent practicable. See the Natural Resources Technical Report for additional details.
Threatened and Endangered Species	Several federal or state listed species were identified within a two-mile radius of the Build Alternative. A review of agency databases identified the Dwarf Wedgemussel (FE/SE), Harperella (FE/SE), Small Whorled Pogonia (FT/SE), Northern long-eared Bat (FT), Green Floater (ST), and one bald eagle nest (Nest Code ST1301) within two miles of the Build Alternative footprint. No critical habitat was identified within the study area for Harperella. A habitat survey was conducted for the Small Whorled Pogonia and Dwarf Wedgemussel within the project study area, which identified marginal habitat for the Small Whorled Pogonia beyond the Build Alternative footprint. Habitat for the Dwarf Wedgemussel was located within the Build Alternative footprint in the Rappahannock River, however no live mussels were found during the survey. If the Dwarf Wedgemussel or Northern Long-eared bat exist in the area, then planning instream work and clearing of forested areas around the determined Time of Year Restrictions for the Dwarf Wedgemussel and the Northern Long-eared bat would help ensure avoidance of an impact to these species. See the following Threatened and Endangered Species section and the Natural Resources Technical Report for additional details.
Anadromous Fish, Trout Streams, and Shellfish	There are three anadromous fish use areas within two miles of the study area. These waters are Hazel Run, Rappahannock River from the former Embry Dam location (removed in 2004) to the Chesapeake Bay, and Rappahannock River from Rocky Pen to Embry Dam (Figure III.4 - Maps 1 and 2). There are no trout waters or shellfish areas in the vicinity of the project study area.
Invasive Species	It is unlikely that invasive species are present in the project study area; however, VDCR has only general information about the distribution of invasive species. Many invasive plant species have adapted to take advantage of soil disturbances and poor soil conditions. Non-native invasive plants are found throughout Virginia. Therefore, the potential exists for some VDOT projects to further the establishment of invasive species. Soil disturbances will be minimized to the extent feasible to inhibit the establishment of invasive species in disturbed areas. Only approved seeds will be used for stabilization.

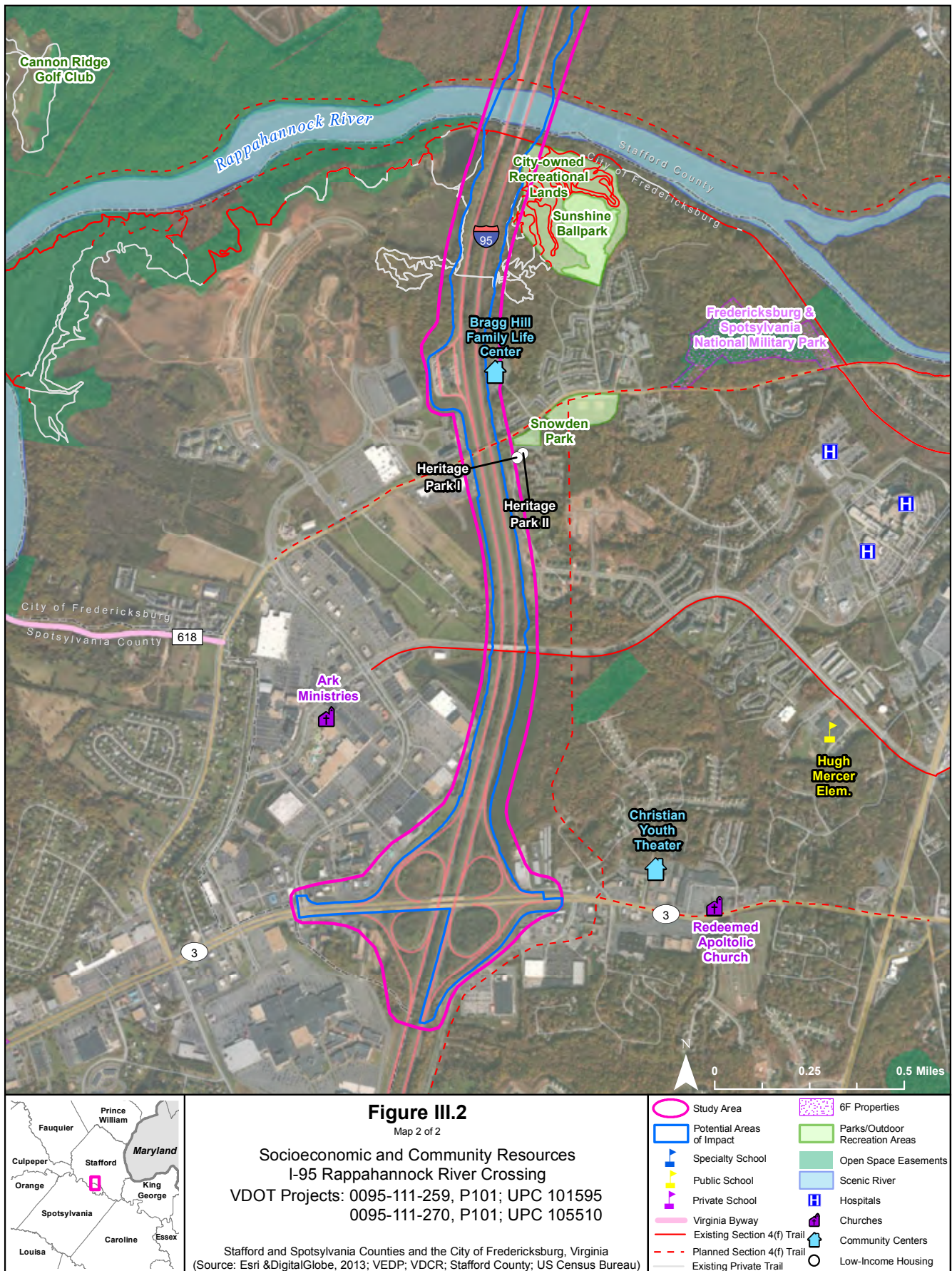
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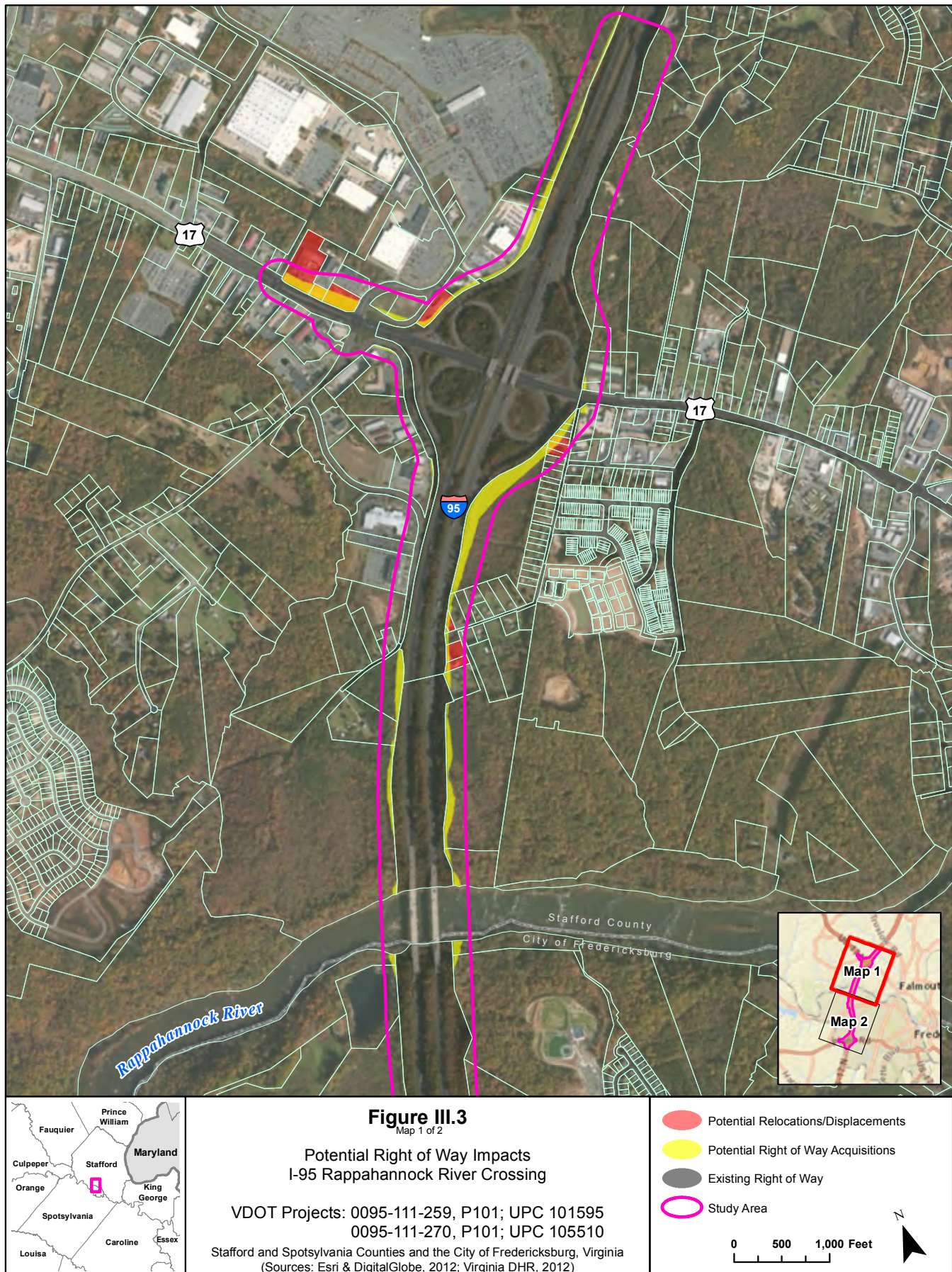
Table III.1: Environmental Resource/Issue Summary

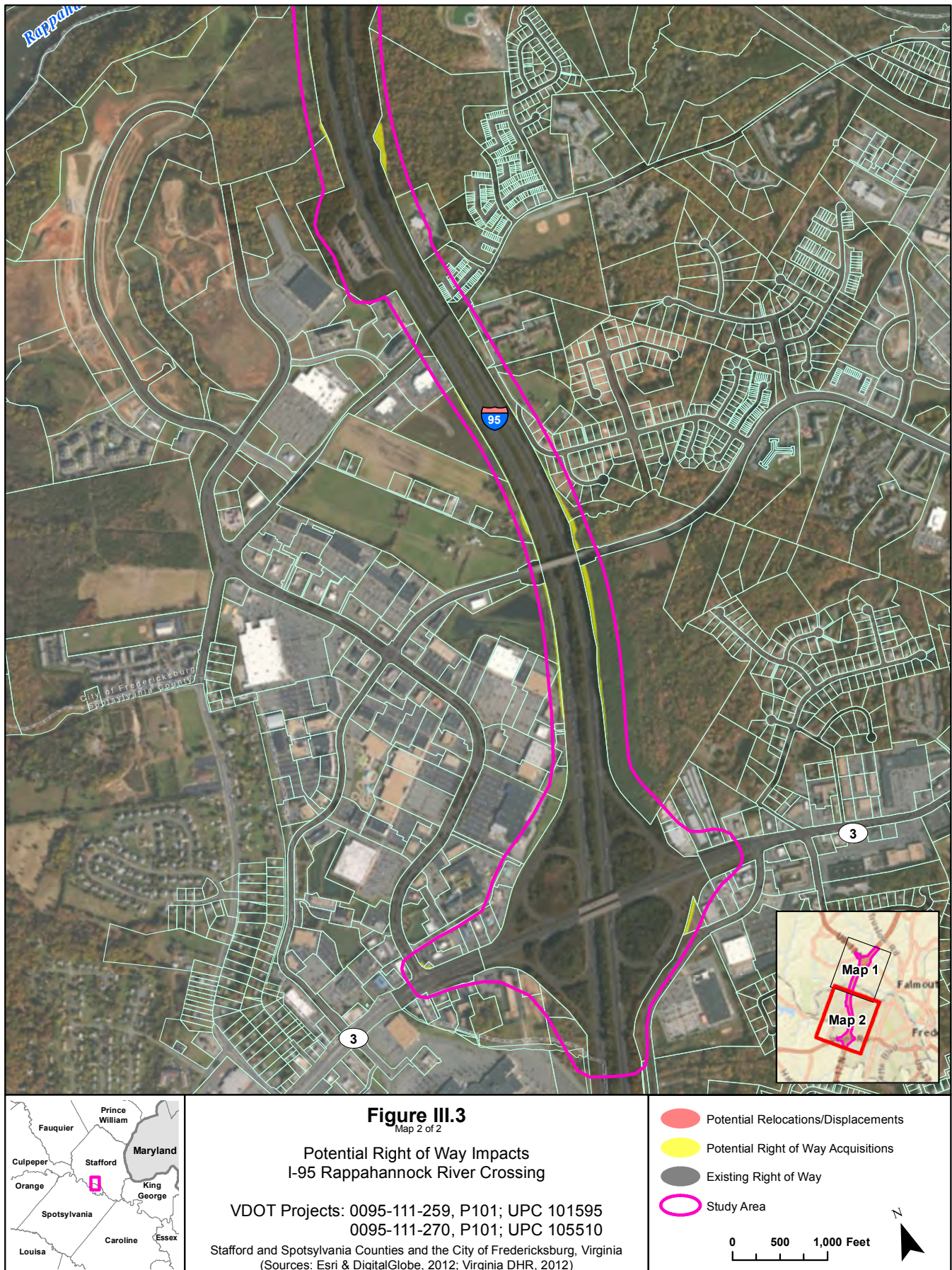
RESOURCE/ISSUE	REMARKS
Historic Properties	<p>In accordance with Section 106 of the National Historic Preservation Act, a Phase I/II Archaeological Survey and Architectural Management Summary were conducted for the project, assessing the archaeological and architectural sites within the corridor. As summarized in the Historic Properties section of this chapter, known archaeology sites are shown on Figure III.5 - Maps 1 and 2. Two eligible archaeological sites (VDHR ID# 44SP0064 and 44SP0074), associated with the Rappahannock Navigation System (VDHR ID# 111-0134), are present within the APE. The results of the Phase I and II investigations completed for the APE are being coordinated with VDHR. As shown on Figure III.6 - Maps 1 and 2, the following architectural resources are eligible for the National Register of Historic Places (NRHP) within the Area of Potential Effect (APE):</p> <ul style="list-style-type: none"> • Rappahannock Navigation System (VDHR ID# 111-0134) represented by: <ul style="list-style-type: none"> • Subsurface remains of Canal Lock #1/Minor's Lock (VDHR ID# 111-0134-0001/44SP0074) • Above-ground and subsurface remains of Rappahannock Canal (VDHR ID# 111-0134-0002/44SP0064) • Fredericksburg I Battlefield (VDHR ID# 111-5295) <p>A formal Section 106 effect determination for the project as a whole will be obtained from VDHR prior to completion of the NEPA process.</p>
Air Quality	<p>The air quality analysis indicated that the project would result in no violations of the National Ambient Air Quality Standards (NAAQS) for ozone (O₃), carbon monoxide (CO) and fine particulate matter (PM_{2.5}) for the Build Alternative. In accordance with Federal Highway Administration (FHWA) guidance, this project is characterized with "higher potential mobile source air toxics (MSAT) effects." However based on analyses completed, annual emissions for the priority MSAT are projected to decrease by 2050, with reductions in the background level of MSAT as well as the possibility of even minor MSAT emissions from this project. The project is also in an area designated as a Maintenance Area for the 8-hour Ozone (1997) standard for which transportation conformity requirements were revoked as of July 20, 2013, and as attainment for other NAAQS. Therefore the project is not subject to transportation conformity requirements. See the Air Quality section for additional information.</p>
Noise	<p>The project was divided into 11 areas of Common Noise Environments (CNEs). These areas contain 192 receptor locations which are comprised of nine monitoring sites and 183 modeling-only sites. The noise analysis indicates that design year build noise levels are predicted to exceed the Noise Abatement Criteria (NAC) at a total of 45 receptors within 7 CNEs representing 77 residences, two playgrounds, one outdoor seating area, and one hotel patio. Two noise barriers, both protecting two CNEs, were determined to be feasible and reasonable (Figures III.7). See the Noise section for additional information.</p>
Hazardous Materials	<p>An Environmental Data Resources (EDR) Radius Map Report was obtained and several databases were searched to determine the hazardous materials within and adjacent to the study area. As shown on Figure III.8, these resources identified 14 sites in total. Four sites are located within the project study area and three are within the Build Alternative footprint: Star Enterprise, a Texaco storage tank location, and a Wawa store/gas station.</p>

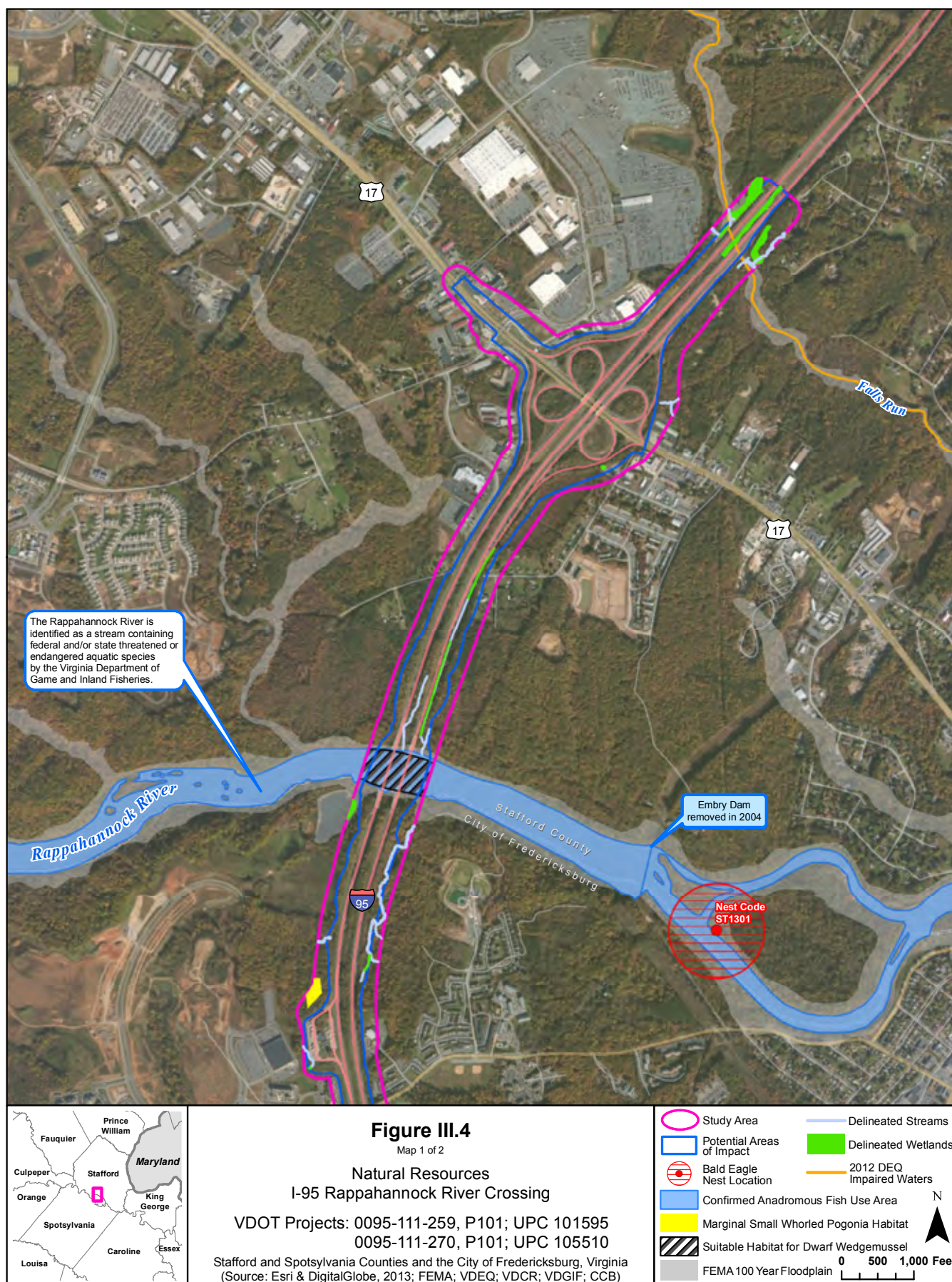




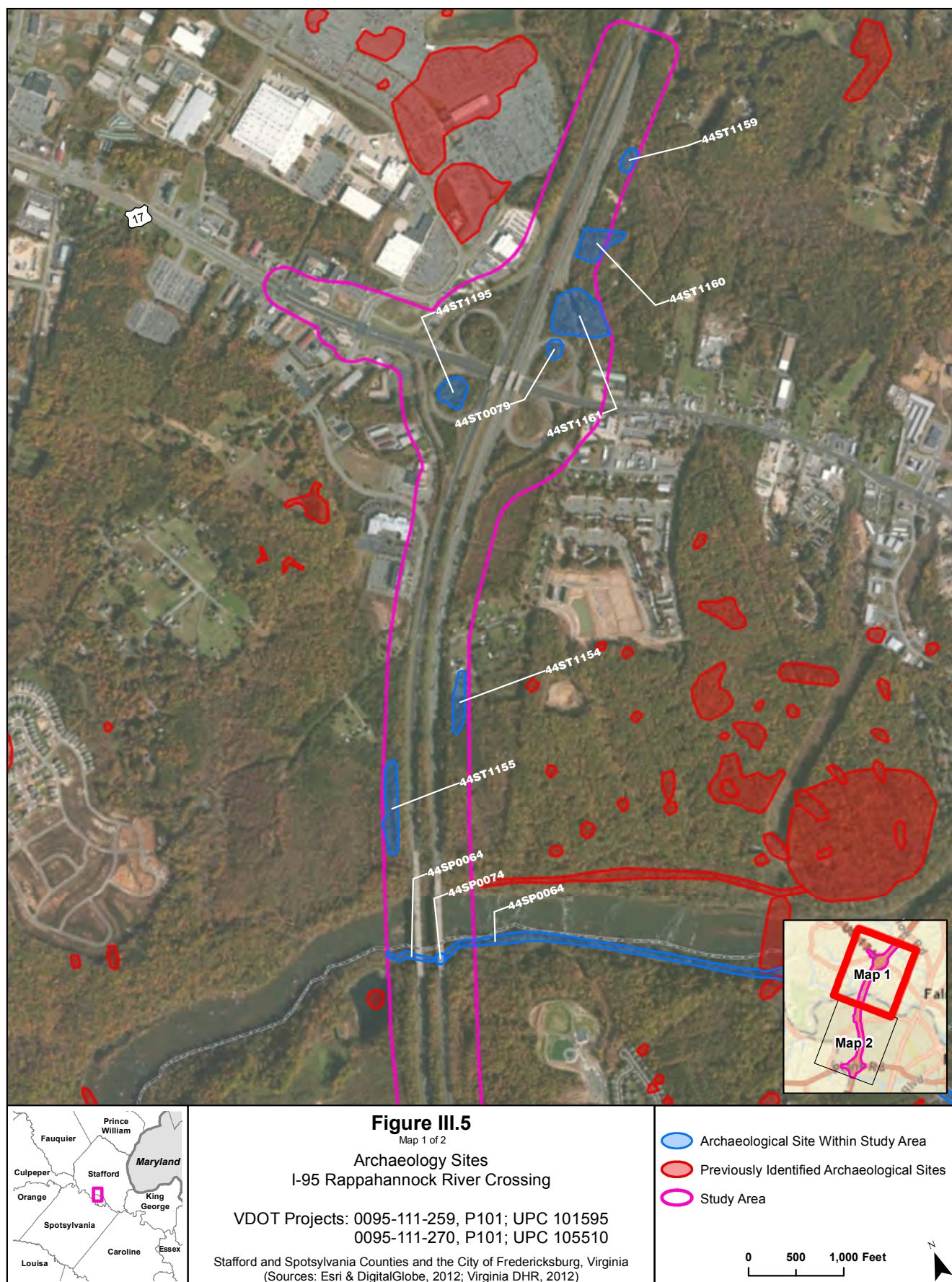


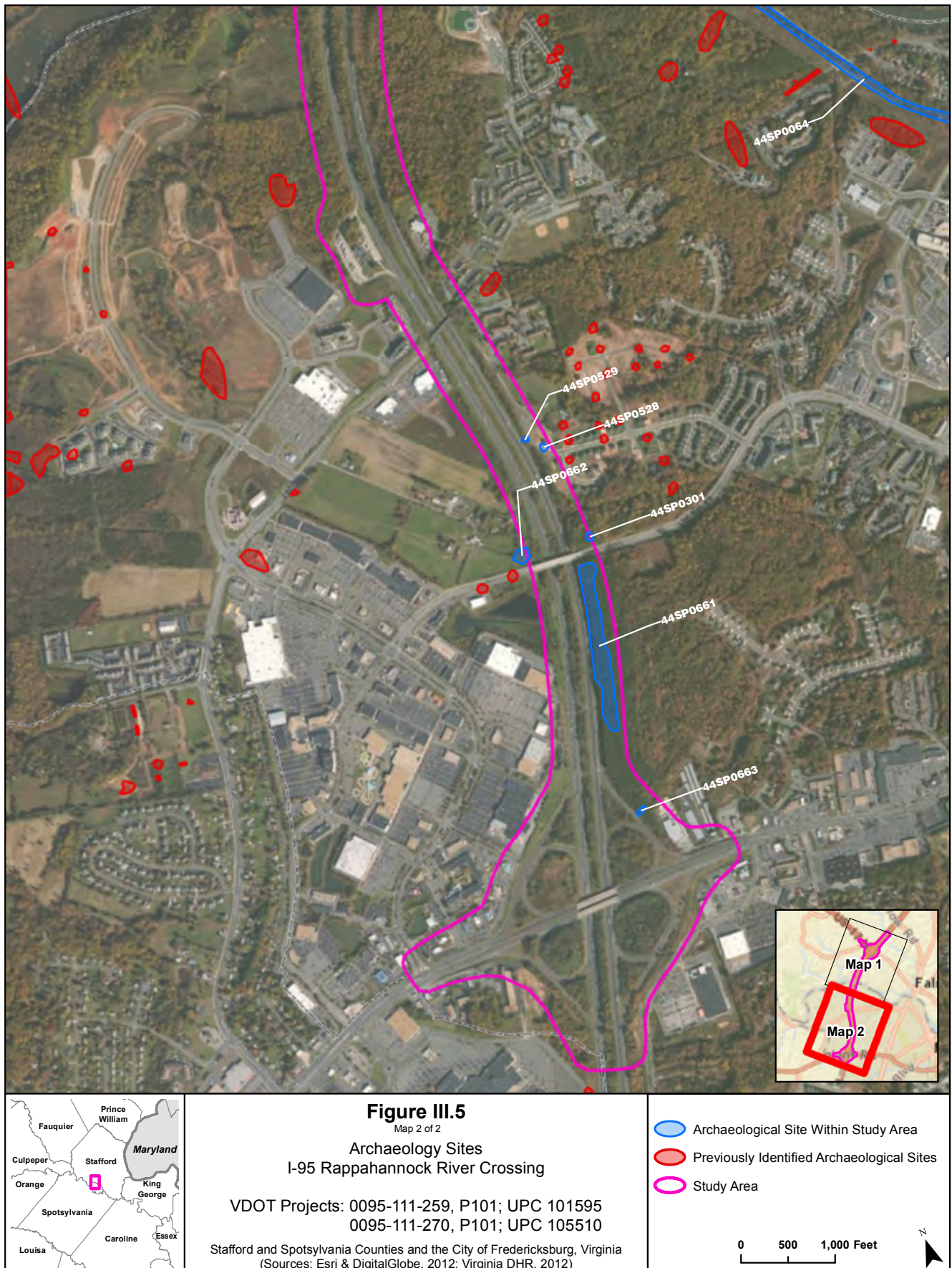


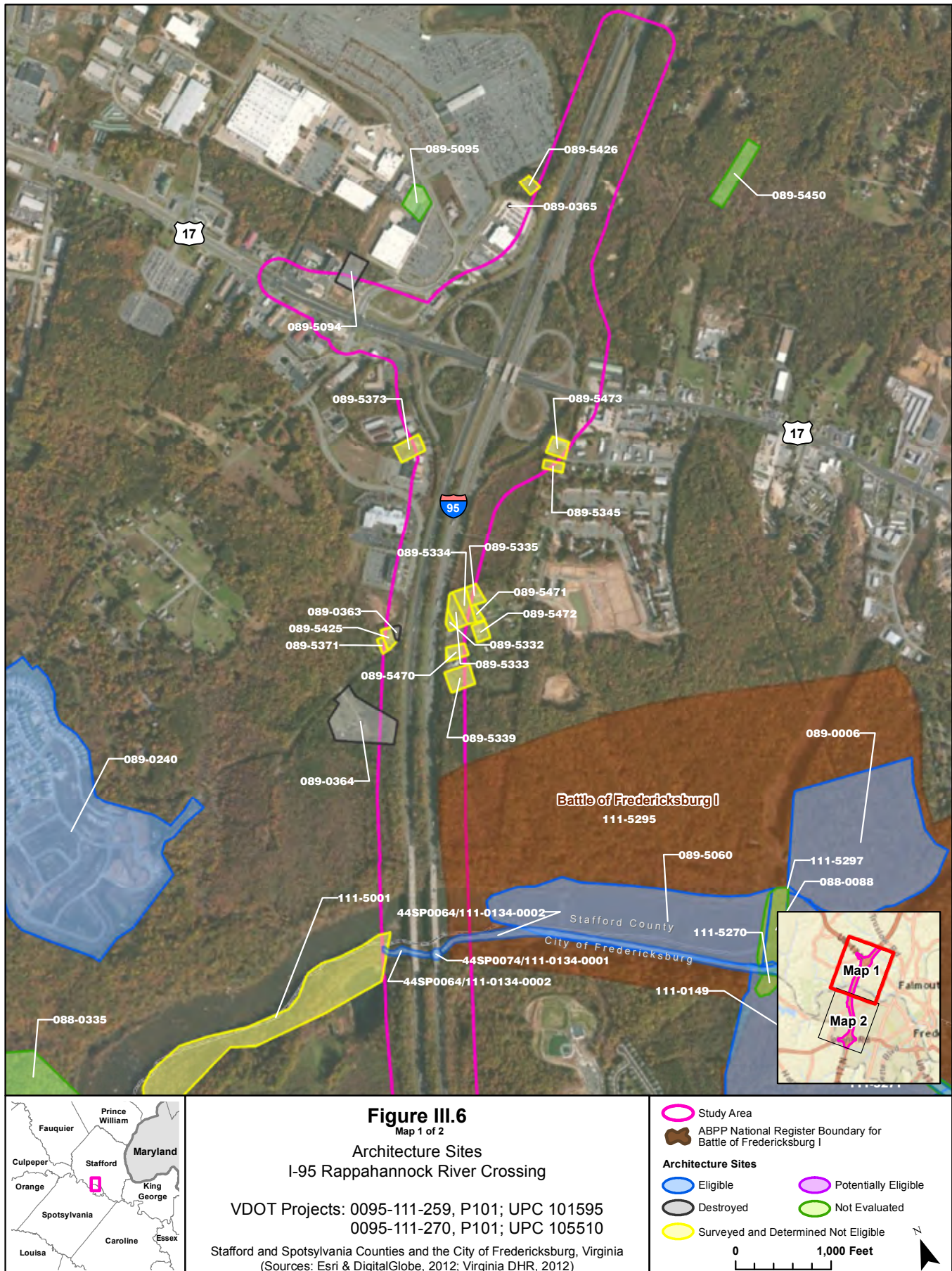


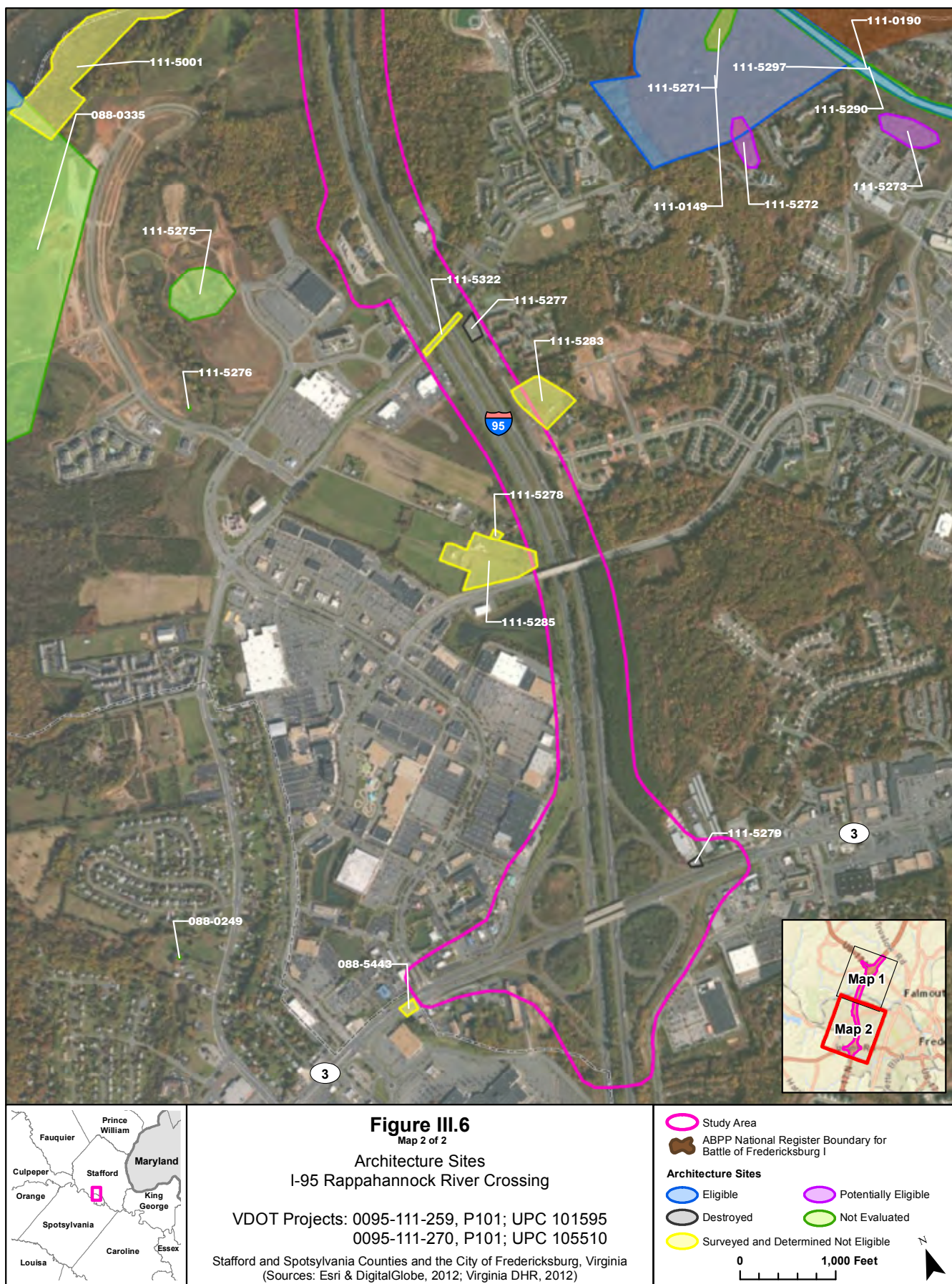












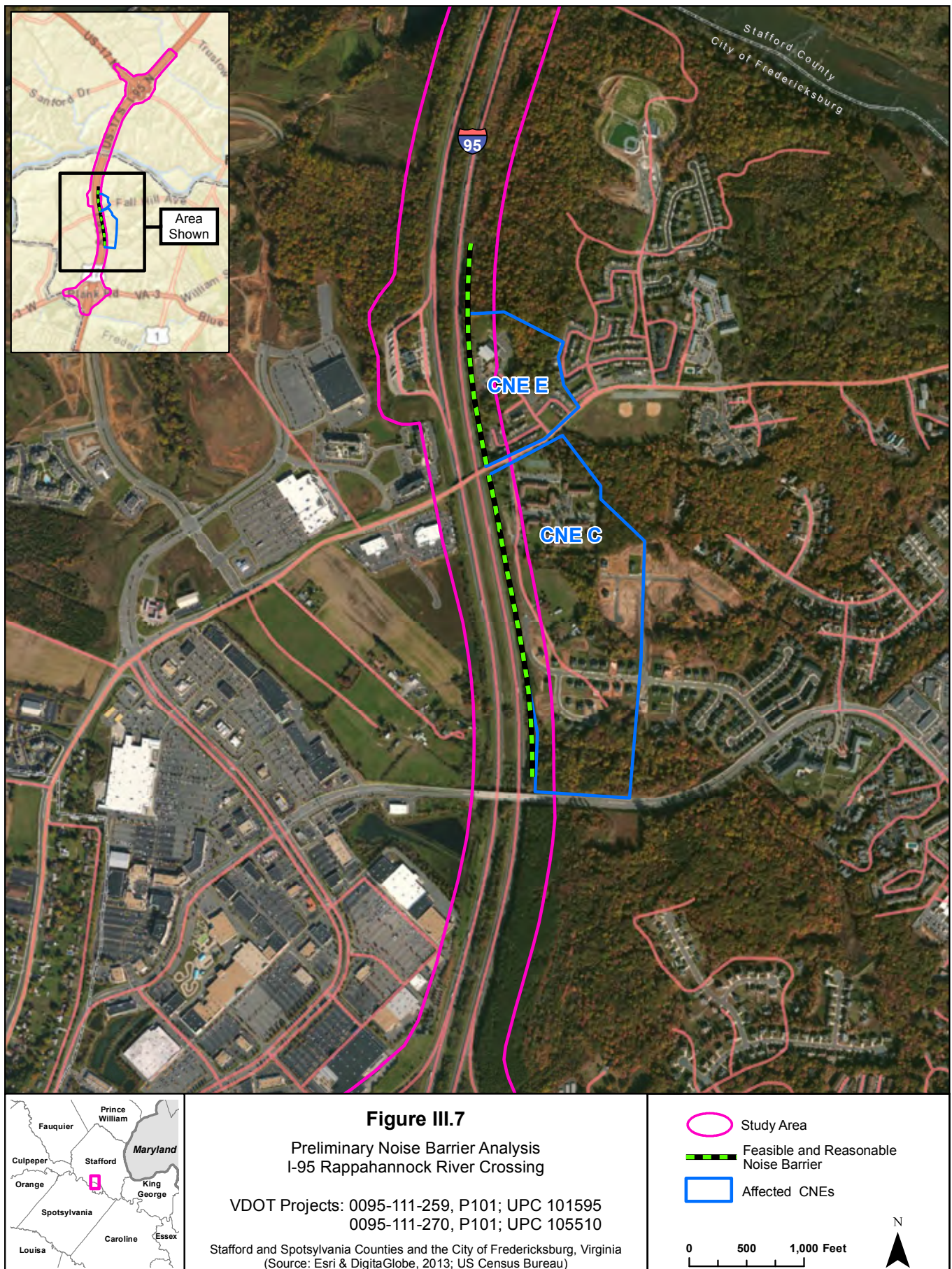


Table III.2: Summary of Potential Impacts

CATEGORY	QUANTITY IN THE STUDY AREA	ESTIMATED IMPACTS OF BUILD ALTERNATIVE	ESTIMATED IMPACTS OF NO-BUILD ALTERNATIVE
Right of Way (count of parcels/acres)	172/174.5	73/32.7	0
Non-Profit Organizations (count of parcels)	1	1	0
Churches (count of parcels)	0	0	0
Low-Income Housing (count of parcels)	2	0	0
Other Community Facilities (count of parcels)	3	0	0
Prime Farmlands (acres)	12.6	0	0
Farmlands of Statewide Importance (acres)	18.0	0	0
Forest Land (acres)	116.8	37.9	0
Streams (linear feet)	10,754	6,408	0
Wetlands (acres)	5.97	2.4	0
FEMA Floodplain (acres)	18.9	13.4	0
Eligible/Potentially Eligible Archaeology Sites (count/acres)	1/1.4	1/1.2	0
Eligible/Potentially Eligible Architectural Sites (count/acres)	2/12.4	2/6.5	0
Noise (count of receptors impacted)	192	45	0
Potential Contaminated Sites (count)	4	3	0



A. SOCIOECONOMICS

Population

The populations in both Spotsylvania and Stafford Counties have grown by more than 35% since 2000 (see **Table III.3**). The population in the City of Fredericksburg has grown by more than 25% since 2000. Between 2010 and 2040, the populations in the counties are projected to more than double, while the population in the City is expected to increase at a slower rate. The populations in the City of Fredericksburg, Spotsylvania County, and Stafford County have been combined to produce a study region total for comparison purposes (see **Table III.3**).

Demographic data (see **Table III.4**) for the counties of Spotsylvania and Stafford, the City of Fredericksburg and nine census block groups that traverse part of the study area were

analyzed to determine whether the proposed project would have impacts on any populations as detailed in *T6640.8A, Title VI of the Civil Rights Act of 1964*, or Environmental Justice populations (see **Title VI/Environmental Justice** section below). Data products from the U.S. Census Bureau were used for demographic information, primarily the 2010 decennial U.S. Census and 2006-2010 American Community Survey (ACS). The nine census block groups are located in the following jurisdictions:

- Spotsylvania County: 020108-1
- Stafford County: 010303-2, 010303-3, 010304-1 and 010304-2
- City of Fredericksburg: 000200-1, 000500-1, 000500-2 and 000500-3

Table III.3: Total Population Over Time

LOCATION	2000	2010	2020	2030	2040	CHANGE 2010- 2040
Spotsylvania County	90,395	122,397	166,236	223,917	299,632	144.80%
Stafford County	92,446	128,961	178,152	244,410	333,654	158.72%
City of Fredericksburg	19,279	24,286	26,647	28,383	29,917	23.19%
Study Region	202,120	275,644	371,035	496,710	663,203	140.60%

Source: <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml> and 2020, 2030, 2040, Weldon Cooper, 2013.

Table III.4: 2010 Demographic Data

LOCATION	TOTAL POPULATION	TOTAL MINORITIES (PERCENT)	PERSONS OVER 65 YEARS (PERCENT)	PERCENTAGE OF FAMILIES IN POVERTY
Commonwealth of Virginia	8,001,024	214,172 (31%)	976,937 (12%)	8%
Spotsylvania County	122,397	29,945 (24%)	12,114 (10%)	7%
Stafford County	128,397	35,478 (28%)	9,464 (7%)	4%
City of Fredericksburg	24,286	8,690 (36%)	2,413 (10%)	13%
Study Area	19,698	7,921 (40%)*	2,134 (11%)*	8%**
Meaningfully Greater Threshold		≥44%	≥12%	≥9%
Census Block Group 020108-1	513	108 (21%)	233 (45%)	N/A
Census Block Group 010303-2	5,172	1,713 (33%)	309 (6%)	1%
Census Block Group 010303-3	1,389	667 (48%)	187 (13%)	6%
Census Block Group 010304-1	2,916	518 (18%)	1,040 (36%)	5%
Census Block Group 010304-2	2,381	1,083 (45%)	78 (3%)	N/A
Census Block Group 000200-1	1,482	930 (63%)	58 (4%)	26%
Census Block Group 000500-1	3,611	1,318 (36%)	175 (5%)	4%
Census Block Group 000500-2	146	70 (48%)	15 (10%)	N/A
Census Block Group 000500-3	2,088	1,514 (73%)	39 (2%)	29%

Source: <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml> (2010 Census and ACS Data) and <http://www.usa.com> (ACS Data)

* "Meaningfully Greater" calculation threshold uses the study area average multiplied by 1.1.

**Percentage of Families in Poverty is not available for all census block groups. The Study Area percentage is an average of available census block groups.

Note: Census block groups with percentages more than the "meaningfully greater" threshold are highlighted in light blue.

Title VI and Environmental Justice

Title VI of the Civil Rights Act of 1964 (Title VI) states that “No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.” Title VI bars intentional discrimination as well as disparate impact discrimination (i.e., a neutral policy or practice that has an unequal impact on protected groups). Data collection to determine the presence of any Title VI populations has occurred as a part of this project and is described below.

Executive Order (EO) 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” states that each Federal agency “shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.”

The US Department of Transportation’s (DOT) most recent order on implementing environmental justice requirements (DOT Order 5610.2(a), issued March 3, 2012) states that “it is the policy of DOT to promote the principles of environmental justice (as embodied in the Executive Order) through the incorporation of those principles in all DOT programs, policies, and activities. This will be done by fully considering environmental justice principles throughout planning and decision-making processes in the development of programs, policies, and activities, using the principles of the National Environmental Policy Act of 1969 (NEPA), Title VI, the Uniform Relocation Assistance (URA) and Real Property Acquisition Policies Act of 1970, as amended, ... and other DOT statutes, regulations and guidance that address or affect infrastructure planning and decision-making.” The FHWA implemented the DOT order via FHWA Order 6640.23A, “FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” (June 14, 2012). The order provides methods to comply with existing applicable regulations and requirements as well as administering FHWA’s “governing statutes so as to identify and avoid discrimination and disproportionately high and adverse effects on minority populations and low-income populations.”

As defined by Title VI and in the guidance for implementing EO 12898, minority populations include citizens or lawful permanent residents of the U.S. who, as defined by FHWA Order 6640.23A, are:

- Black: a person having origins in any of the black racial groups of Africa;
- Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central, or South American or other Spanish culture or origin, regardless of race;

- Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent;
- American Indian and Alaskan Native: a person having origins in any of the original people of North America or South America (including Central America) and who maintains cultural identification through tribal affiliation or community recognition; or
- Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

Consistent with the Council on Environmental Quality’s (CEQ) *Environmental Justice Guidance* under the *National Environmental Policy Act* (CEQ, 1997), the criteria for identification of minority populations within the study region include census tracts in which the minority population percentage exceeds 50% or the minority population is “meaningfully greater” than the minority population percentage in the “general population or other appropriate unit of geographic analysis.” Populations of minorities that are 10% higher than that of the study region were considered to be meaningfully greater than that of the study region. The 10% threshold also represents “a readily identifiable group” of minority persons, pursuant to DOT Order 5610.2(a).

Based on the above criteria, five census block groups within the study area appear to have potential EJ minority populations, as depicted in **Figure III.1**. Two census block groups, 000500-3 (73%) and 000200-1 (63%), exceed 50% of minority populations. Census block groups 000500-2 (48%), 000500-3 (73%) and 000200-1 (63%) in the City of Fredericksburg and census block groups 010303-3 (48%) and 010304-2 (45%) in Stafford County each have populations that are 10% greater than the study area average (40%) and are therefore “meaningfully greater”.

There are three census block groups that have populations of persons over 65 years of age and can be considered “meaningfully greater” because they are 10% greater than the study area (12%). Census block group 020108-1 (45%) in Spotsylvania County and census block groups 010303-3 (13%) and 010304-1 (36%) are each 10% greater than the study area.

The Department of Health and Human Services (DHHS) 2014 Poverty Guidelines states that if the total income of a family of four is under \$23,850, that family is then considered to be in poverty. No census block groups in the study area fall below the DHHS guidelines. However, based on 2010 Census poverty level percentages and the “meaningfully greater” calculation, census block groups 000200-1 (26%) and 000500-3 (29%) have higher numbers of families in poverty versus the study area (8%) combined with the 10% multiplier. The high number of low-income persons in census block groups 000200-1 and 000500-3 may be due to the presence of the University of

Mary Washington. Students in dormitories are classified by the U.S. Census as living in group quarters and are not included in poverty calculations. However, the remaining students not living in dormitories do affect the demographics of the city and the census block groups in which they reside. The EJ populations in block groups 000200-1 and 000500-3 potentially could be subject to disproportionately high and/or adverse impacts.

While the No-Build Alternative would not impact socio-economic and EJ populations, these populations would benefit from the proposed improvements of this project. The Build Alternative would require three residential relocations from census block group 010303-3. There are no impacts to community facilities that serve the EJ populations. The Build Alternative would not impact community cohesion, accessibility, health and safety concerns and social changes in the study area. It is also anticipated to positively affect regional economy and employment by decreasing congestion, increasing accessibility, and improving mobility and safety along I-95, VA 3 and US 17. Based on the analysis above, the project would not cause disproportionately high and adverse effects on minority or low-income populations in accordance with the provisions of E.O. 12898 and FHWA Order 6640.23. No further EJ analysis is required.

Limited English Proficiency

Executive Order 13166, "Improving Access to Services for Persons with Limited English Proficiency," directs federal

agencies to "examine the services they provide, identify any need for services to those with Limited English Proficiency (LEP), and develop and implement a system to provide those services so LEP persons can have meaningful access to them." As a part of EO 13166, the Department of Justice issued guidance on implementing the LEP regulations because of the inherent connection between Title VI barring of discrimination based on national origin and EO 13166. Data has been collected to determine the presence of persons with LEP and public involvement would be conducted to seek out and consider the needs of the LEP population as a part of this project. At the census tract level, percentage of persons that "Speak English Very Well" is part of the "Languages Spoken at Home" data set. The percentage ranges from 89% - 98% in the study area. While there don't seem to be any outliers of non-English speaking populations within the study area, if any groups are discovered during the public involvement process, appropriate measures would be taken to make sure appropriate information is readily available for these persons.

Community Facilities

There are five community facilities located within the study area, which can be seen in **Figure III.2 - Maps 1 and 2** and are outlined in **Table III.5** below. Right of way acquisitions and potential relocations are not anticipated for these facilities because the proposed project would be designed to avoid or minimize impacts to any existing and proposed community facilities as reasonably feasible.

Table III.5: Community Facilities

FACILITY	ADDRESS	DESCRIPTION
Strayer University	150 Riverside Parkway #100 Fredericksburg, VA 22406	A private, for-profit higher education institution. There are 3,004 students enrolled at the Fredericksburg, VA, campus, which specializes in degree programs for working adults.
Career Training Solutions	100 Riverside Parkway Fredericksburg, VA 22406	A private for-profit facility that offers career education and training in the nursing, allied health, information technology, health and beauty industries.
Bragg Hill Family Life Center	400 Bragg Hill Drive Fredericksburg, VA 22401	A 501(c)(3) non-profit organization that works with underprivileged families, at risk youth and provides free services to families in the George Washington Planning District #16 and surrounding districts.
Heritage Park I & Heritage Park II	100 Heritage Park Place Fredericksburg, VA 22401	Heritage Park I & II are low-income apartments that are government funded. The government gives funds directly to the owner and the owner charges persons lower rents. It also accepts US Housing and Urban Development (HUD) subsidies. There are approximately 200 units that are 2-3 bedrooms.

B. LAND USE

Spotsylvania County

The project is located in Spotsylvania County in the Primary Settlement District. This district is where most of the development in the county has recently occurred and is projected to accommodate the majority of future growth. As stated in the Purpose and Need, the Primary Settlement District contains most of the commercial, office, and industrial uses located in Spotsylvania County, in addition to residential subdivisions.

City of Fredericksburg

The Build Alternative is partially located within two Land Use Planning Areas, Celebrate Virginia and Central Park, as designated by the Fredericksburg Comprehensive Plan¹. The existing land use for the Celebrate Virginia Planning Area is composed of predominantly commercial-zoned parcels, containing the Celebrate Virginia South development, along with one multi-family residential development, and minimal single-family residential development. The commercial portion of Celebrate Virginia includes hotels, a conference center, and numerous retail and service-oriented businesses. In addition, a 129-acre conservation easement exists to preserve Civil War resources and to screen development viewable from the Rappahannock River. According to recommendations in the Fredericksburg Comprehensive Plan, the Celebrate Virginia Planning Area should attract outside visitors to the City of Fredericksburg by functioning as a visitor destination.

The Central Park Land Use Planning Area is a 310-acre retail and office space complex that is the major retail destination within western Fredericksburg. The proposed project would contribute to this objective by reducing congestion on I-95 and VA 3, which provides access to the Central Park Planning Area. Scattered single family homes exist outside of the retail development.

Stafford County

The Stafford County portion of the study corridor falls within the county's Urban Service Area, with some of the corridor designated as the Southern Gateway Urban Development Area (UDA), due to its proximity with US 17 and I-95. Stafford County employs the growth management technique of defining Urban Service Areas to determine what may be served by the public water and sewer lines. Existing land uses within this portion of the study corridor include commercial, residential, agricultural, and parks and open space.

C. PARKS AND RECREATIONAL FACILITIES

As depicted in **Figure III.2 - Maps 1 and 2** and detailed in **Appendix C: Section 4(f) Memorandum**, there are two publicly owned park/recreation areas adjacent to the project study area: Snowden Park and a City-owned parcel containing recreational lands, both of which are within the City of Fredericksburg. Snowden Park consists of baseball fields and a playground located off Fall Hill Avenue; however, it would not be impacted by the project because its limits lie outside of the footprint of the Build Alternative. The recreational lands owned by the City of Fredericksburg contain a baseball facility and unpaved recreational trails. The Build Alternative footprint would encroach upon the undeveloped portion of the property, and based on the conceptual design, approximately 0.1 acre of right of way would need to be acquired from this parcel.

In addition to the parks/recreation areas, there are three existing and four proposed public trails along the I-95 corridor within the study area: Pool Pass Trail, Scout Trail (also known as the Embury Dam Trail and/or Rappahannock Canal Trail), Cowan Boulevard Trail, proposed Celebrate Virginia/USGS Trail, proposed Fall Hill Avenue Trail, proposed Gateway Boulevard Trail and proposed Cannon Ridge-Ferry Farm Trail, as shown in **Figure III.2 - Maps 1 and 2**. Temporary impacts are anticipated to the Pool Pass Trail, Scout/Embry Dam/Rappahannock Canal Trail and the proposed Cannon Ridge-Ferry Farm Trail. Detailed descriptions of these resources and their potential impacts are included in **Appendix C: Section 4(f) Memorandum** and in the following **Section 4(f) Resources** discussion.



¹ Fredericksburg Comprehensive Plan, Fredericksburg, Virginia, Chapter 7: Suburban Business Districts, Adopted September 25, 2007.

D. SECTION 4(F) RESOURCES

Section 4(f) of the US Department of Transportation Act of 1966, as amended, pertains to uses of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites. Anticipated impacts to the Section 4(f) resources within the project study area are shown in **Table III.6**. Details on these properties can be found in **Appendix C: Section 4(f) Memorandum** and in the **Parks and Recreational Facilities** and **Historic Properties** sections of this chapter.

Under regulations implementing Section 4(f) (23 CFR 774), the public is hereby notified that FHWA intends to make a *de minimis* impact finding with respect to the project's Section 4(f) involvement with each of the resources noted above. The basis for these findings includes the following:

- The project would not permanently interrupt the continuity of the trails and/or recreational areas.
- Temporary suspensions of pedestrian and bicycle traffic on trails would last no longer than necessary to complete the project construction. Limitations of access would be coordinated throughout construction with the local governments.

- The project would be designed to ensure the future design and construction of the proposed trails would not be prohibited.
- The land disturbed by construction would be fully restored.
- Officials with jurisdiction over the trails and recreational areas will be asked to concur in the *de minimis* determination following an opportunity for public comment.
- The public will be given opportunity at the public hearing to review and comment on the proposed project and the proposed *de minimis* impact finding.

In order to make a finding of *de minimis* impact for each historic property listed in **Table III.6**, VDHR would need to issue a No Effect or No Adverse Effect determination for that resource and, following the public hearing, FHWA would then notify VDHR of its intent to issue the *de minimis* impact finding for each resource. However, if VDHR issues an Adverse Effect determination for impacts to one of the historic properties listed in **Table III.6**, additional coordination would be necessary, and if the Section 4(f) use cannot be avoided, an Individual Section 4(f) Evaluation may need to be prepared.

Table III.6: Section 4(f) Resources

SECTION 4(F) RESOURCE	FUNCTION OF THE RESOURCE	ANTICIPATED AREA OF SECTION 4(F) USE	ANTICIPATED SECTION 4(F) USE/FINDING
Snowden Park	Park	0	No Impact
City-Owned Recreational Lands	Recreation Lands	0.1 acre	<i>De Minimis</i>
Pool Pass Trail	Trail	0.04 acre	<i>De Minimis</i>
Scout/Embry Dam/Rappahannock Canal Trail	Trail	0.3 acre	<i>De Minimis</i>
Proposed Celebrate Virginia/USGS Trail	Trail	0	No Impact
Cowan Boulevard Trail	Trail	0	No Impact
Proposed Fall Hill Avenue Trail	Trail	0	No Impact
Proposed Gateway Boulevard Trail	Trail	0	No Impact
Proposed Cannon Ridge-Ferry Farm Trail	Trail	0.2 acre	<i>De Minimis</i>
Rappahannock Navigation (111-0134)	Historic property	1.2 acres	Potentially <i>De Minimis</i> *
Battle of Fredericksburg I (111-5295/VA-028)	Historic property	1.6 acres	Potentially <i>De Minimis</i> *

* Coordination is ongoing with VDHR, therefore this impact is tentatively considered *de minimis*

E. RIGHT OF WAY AND RELOCATION

As outlined in **Table III.7** and shown in **Figure III.3 - Maps 1 and 2**, the Build Alternative would potentially impact 18 residential properties and 47 commercial properties. Potential right of way acquisition estimates for the Build Alternative include 2.5 acres from residential properties and 20.1 acres from commercial properties. In addition to the potential acquisition impacts, the Build Alternative may require the relocation of three residential and five commercial properties, which involve 1.6 acres from residential properties and 8.5 acres from commercial properties. These relocations are outlined in **Table III.8**.

If the Build Alternative advances, VDOT would develop a detailed relocation plan for each of the displaced residents and commercial enterprises during the final design stage of the project. The acquisition of property and any necessary relocations would be conducted in accordance with applicable Federal laws, regulations and requirements, including but not limited to, 23 CFR Part 710, the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended and its implementing regulations found in 49 CFR Part 24.

F. NATURAL RESOURCES

Waters of the United States, including Wetlands

Using both desktop and field review components, the footprint of the Build Alternative was assessed for the presence and location of Waters of the United States (WUS), including wetlands. A formal jurisdictional determination was not completed as part of this study. Therefore, linear footage and acreage estimates within this report referencing jurisdictional features are subject to verification by the U.S. Army Corps of Engineers (Corps).

The Rappahannock River is the main watercourse through the project study area, flowing generally west to east. Additional primary systems include Hazel Run, Falls Run, and Fall Quarry Run. Perennial, intermittent, and ephemeral channels are located within the area reviewed. The wetland systems (which are predominantly forested and emergent systems) within the Build Alternative are located along the stream channels. As noted above, systems located within the Build Alternative footprint are non-tidal systems. There are no tidal waters located in the immediate vicinity of the project.

Table III.7: Right of Way and Property Impacts

TYPE	WITHIN THE STUDY AREA		POTENTIAL RIGHT OF WAY ACQUISITION		POTENTIAL RELOCATIONS	
	PROPERTIES	ACREAGE	PROPERTIES	ACREAGE	PROPERTIES	ACREAGE
Residential Parcels	63	24.7	18	2.5	3	1.6
Commercial Parcels	108	146.6	47	20.1	5	8.5
Non-Profit Parcels	1	3.2	0	0	0	0
Study Region	172	174.5	65	22.6	8	10.1

Table III.8: Potential Relocations

TYPE	LOCALITY	ADDRESS	ASSESSED VALUE	COMMENTS
Single Family Residential	Stafford County	8 Krieger Lane	\$116,900	Owner does not reside at address, likely rental.
Single Family Residential	Stafford County	12 Krieger Lane	\$162,600	Owner does not reside at address, likely rental.
Single Family Residential	Stafford County	100 Musselman Road	\$135,000	Owner does not reside at address, likely rental.
Commercial/Office	Stafford County	500 Musselman Road	\$162,200	Hawkins and Associates - land surveying services.
Commercial/Restaurant	Stafford County	44 Stanstead Road	\$1.8 Million	McDonald's Corporation
Commercial/Gas/Retail	Stafford County	9 South Gateway Drive	\$2.5 Million	Wawa #8627, owned by Lark Properties, LLC
Commercial/Gas/Retail	Stafford County	554 Warrenton Road	\$583,500	Shell, owned by Quarles-Robertson Oil, Inc.
Commercial/Hotel	Stafford County	564 Warrenton Road	\$2.9 Million	Shell, owned by Quarles-Robertson Oil, Inc.

The estimated amount of both wetland and stream channel impacts which would occur from the Build Alternative is 2.4 acres and 6,408 linear feet, respectively. These impact areas can be seen in **Figure III.4 - Maps 1 and 2**, and additional details can be found in the **Natural Resources Technical Report**. The preliminary impact estimate is based on the overlay of the Build Alternative's footprint, which consists of the proposed cut/fill boundaries.

The required mitigation measures for stream and wetland impacts would be identified for the Build Alternative during final design. These measures would include avoidance and minimization efforts to the greatest extent practicable. Some measures which may be considered include: the use and appropriate placement of erosion and sediment control measures and best management practices, the use of upgraded erosion and sediment controls in environmentally sensitive areas, bridging/spanning of streams and wetlands, alignment shifts around specific systems, the use of cofferdams, steepening of slopes and the use of retaining walls on steeper slopes, properly countersunk culverts, stream relocation to improve skew angle and shorten culverts if new culverts are necessary, and ensuring groundwater recharge/wetland hydrology maintenance through the location of outfalls and infiltration trenches. Following construction practices, any additional stormwater generated through new impervious surfaces would be treated through improved stormwater management systems.

Coordination with the Corps, VDEQ, and the Virginia Marine Resources Commission (VMRC) would be required during the permitting phase of the project to determine the jurisdictional limits of surface waters and to make a final determination of the need for and type of permits. Both temporary and permanent effects to jurisdictional wetland and stream systems would require a permitting decision from these agencies. It is anticipated that a Section 404 permit from the Corps, a Virginia Water Protection (VWP) General Permit from the VDEQ, and a Subaqueous Bottomlands Permit from the VMRC would be required. The project may qualify for a Corps State Programmatic General Permit (12-SPGP-01) based on the degree of impacts. For VDOT projects, VMRC issues the Virginia General Permit (VGP)-1 permit for subaqueous bottom encroachments where the drainage area of the impact zone(s) exceeds five square miles or for projects crossing state-owned bottomlands. The drainage area of the Rappahannock River is greater than five square miles at the project location. Wetland impacts are exempted by VMRC for any project where the state government is the permittee. The final determination of permit type would be completed through the permitting process once the project proceeds to the design and permitting phase.

Compensatory mitigation would likely be required for permanent impacts to stream and wetlands resulting from the construction activities. Compensatory mitigation is typically required in the same or adjacent hydrologic unit code (HUC)

within the same watershed and physiographic province as the impact. As part of the permitting process, mitigation options would be investigated using the various agency resources including the July 2004 Joint Corps and VDEQ *Recommendations for Wetland Compensatory Mitigation: Including Site Design, Permit Conditions, Performance Criteria, and Monitoring Criteria* and the associated *Mitigation Checklist*, as well as the March 2008 *Offsite Mitigation Guidelines*. Of greatest significance, on April 10, 2008, new regulations providing guidance for compensatory mitigation was jointly issued by the Corps and the United States Environmental Protection Agency (EPA). The new mitigation rule, which became effective June 9, 2008, changed the federal permitting preference regarding how compensatory mitigation is accomplished for project impacts to jurisdictional surface waters. This rule does not change when compensation is required.

In accordance with the existing regulations and standard permit conditions, temporary impacts would also be required to be restored to their original contours and re-vegetated with the same or similar species. Additional compensatory mitigation other than previously stated for temporary impacts is typically not required through the permitting process. Additional details are included in the **Natural Resources Technical Report**.

Water Quality

A number of stream systems and other waterbodies, including reservoirs, in the Lower Rappahannock River sub-basin have been listed as impaired in the VDEQ Final 2012 305(b)/303(d) Water Quality Assessment Integrated Report (Integrated Report). Specifically, the Rappahannock River and Falls Run are waterbodies that intersect the study area and have been listed with a Cause Category of 5A (the reach of the Rappahannock River listed as impaired is located approximately 1.5 miles downstream to the east of the intersection with I-95 and outside the study area). Additional impaired waterbodies in the vicinity of the study area include Claiborne Run (located outside the study area and intersecting I-95 approximately 1.3 miles north of where Falls Run intersects I-95) and Hazel Run (located outside the study area and intersecting I-95 approximately 0.7 mile south of the intersection of VA 3 and I-95). Figure III.4 - Maps 1 and 2 shows the location of the impaired waters within an approximate one-mile radius of the study area.

Potential impacts to water quality would be expected to be minimized with the use of approved sediment and erosion control during construction and implementation of stormwater best management practices. Potential impacts during construction could include physical disturbances or alterations, accidental spills, and sediment releases that can affect aquatic life. Following the removal of vegetation, wind and rain could severely erode large areas of soil exposed during construction, considerably increasing sediment load to receiving waters.

In addition to the permits listed above, the project would require local and state permits for stormwater management. These permits would be required prior to the initiation of the construction of the project.

FEMA Floodplains

Using both desktop and field review components, the footprint of the Build Alternative was assessed for the presence and location of the FEMA 100-year floodplain within the project study area. The Rappahannock River is the main watercourse through the project study area, flowing generally west to east. The 100-year floodplain for an additional primary system, Falls Run, also is located within the footprint of the Build Alternative. The estimated amount of FEMA floodplain impacts that would occur from the Build Alternative is 12.4 acres along the Rappahannock River and 0.99 acres along Falls Run. Additional details about these areas can be found in the *Natural Resources Technical Report*.

Threatened and Endangered Species

Several federal and/or state listed threatened and endangered species were identified within a two-mile radius of the Build Alternative. A review of agency databases identified the Dwarf Wedgemussel (FE/SE), Harperella (FE/SE), Small Whorled Pogonia (FT/SE), Green Floater (ST), Northern Long-eared bat (FT), and one bald eagle nest (Nest Code ST1301) within two miles of the Build Alternative footprint.

Based on the database results, critical habitats for the Dwarf Wedgemussel, Harperella, and Small Whorled Pogonia were not identified within study area. Additionally, the Green Floater and referenced Bald Eagle nest were not identified within the footprint of the Build Alternative.

Habitat surveys were conducted for the Dwarf Wedgemussel and the Small Whorled Pogonia to determine the potential for habitats within the project study area. It was determined that the section of the Rappahannock River located within the footprint for the Build Alternative contains suitable habitat areas for the Dwarf Wedgemussel and may potentially support populations of the species. A mussel survey shall be completed prior to construction to determine if the species is present and to relocate Dwarf Wedgemussel individuals should they be found to be contained within the limits of the project. During the permitting process, Time of Year Restrictions could be

implemented for the mussel, which would prohibit instream work between March 15th through May 31st and August 15th through October 15th of any year, as recommended in the Virginia Department of Game and Inland Fisheries' (VDGIF) Time of Year Restrictions Table.²

The survey also identified suitable habitat for the Small Whorled Pogonia located within the project study area north of the Virginia Welcome Center, but not within the anticipated footprint for the Build Alternative. Should the permitting agencies require a survey for the plant species, the surveys would need to be conducted between June 1st and July 20th of any year for this project location.

The Northern Long-eared Bat was officially listed as Federally Threatened on May 4, 2015, and was identified in database results within two miles of the study area. A habitat survey for the Northern Long-eared bat has not been completed. Measures to ensure avoidance and minimization of impacts to this species are being developed, however, in the interim, VDOT has developed guidance that includes a time-of-year restriction for tree removal (greater than 3-inches diameter breast height), which must be performed outside the species roosting season (April 15th through September 15th). Additionally, any tree removal should be limited to trees located within 100 feet of the existing road surface. Additional agency coordination and re-evaluation concerning the Northern Long-eared bat will be conducted during the permitting process.

G. HISTORIC PROPERTIES

Consideration of the project's potential to affect historic buildings, structures, sites, districts, and objects that are listed or eligible for listing on the National Register of Historic Places (NRHP) has been conducted in accordance with the requirements of Section 106 of the National Historic Preservation Act (54 U.S.C. 306108) and its implementing regulations, 36 CFR Part 800.

Archaeological Sites

Background research and archaeological field survey and testing were completed to identify archaeological historic properties within the project study area, as shown in **Figure III.5 - Maps 1 and 2**. A total of 15 archaeological sites were identified within the archaeological Area of Potential Effect (APE).

² VDGIF Time of Year Restrictions (TOYR) Table; VDGIF; March 26, 2015; <http://www.dgif.virginia.gov/environmental-programs/files/VDGIF-Time-of-Year-Restrictions-Table.pdf>; Accessed June 4, 2015.

Six archaeological resources were identified within the archaeological APE during previous archaeological surveys or informant interviews. Three of the six sites (44SP0301, 44SP0528, and 44SP0529) were previously determined by the Virginia State Historic Preservation Office to be not eligible for inclusion in the NRHP. Two of the six sites -- above-ground and archaeological remains of a canal segment (VDHR ID# 44SP0064/111-0134-0002) and the archaeological remains of a canal lock (Lock No. 1/Minor's Lock; VDHR ID# 44SP0074/111-0134-0001 -- are components of the Rappahannock Navigation System (VDHR ID# 111-0134), which was determined eligible for the NRHP by the Keeper of the National Register in 2000. The sixth site (VDHR ID# 44ST0079), identified as the remains of a potential Civil War period encampment, had not previously been evaluated for NRHP-eligibility.

Archaeological field survey conducted for the Rappahannock River Crossing project identified nine additional sites (44SP0661, 44SP0662, 44SP0663, 44ST1154, 44ST1155, 44ST1159, 44ST1160, 44ST1161, and 44ST1195), relocated the two previously recorded components of the Rappahannock Navigation System, and determined that the previously recorded Civil War component of VDHR ID# 44ST0079 had been destroyed. Additional archaeological investigations were conducted at four of the sites as needed to further evaluate their eligibility for the NRHP.

As a result of its investigations, VDOT has concluded that the only two sites within the APE that are eligible for the NRHP are the two components of the Rappahannock Navigation System: the above-ground and archaeological remains of a canal segment (VDHR ID# 44SP0064/111-0134-0002) and the archaeological remains of a canal lock (Lock No. 1/Minor's Lock; VDHR ID# 44SP0074/111-0134-0001). VDOT believes that both of these components are eligible for the NRHP as contributing elements to the Rappahannock Navigation System under NRHP Criterion A, for their association with a major transportation system of the Antebellum Period (1830-1860); Criterion C, for their engineering significance; and Criterion D, for their potential to yield important archaeological information related to the engineering of the navigation system. These findings are being coordinated with the VA SHPO and other consulting parties to the Section 106 process.

Architectural Resources

Background research and architectural survey conducted by VDOT identified and documented a total of 31 architectural resources 50 or more years of age within the project's APE for above-ground historic resources (see **Figure III.6 - Maps 1 and 2**). VDOT coordinated the results of its identification efforts with the VA SHPO and consulting parties to the Section 106

process, and the VA SHPO has concurred that only two of these resources are eligible for the NRHP: the previously discussed canal segment (VDHR ID# 44SP0064/111-0134-0002) of the Rappahannock Navigation System (VDHR ID# 111-0134), which was determined eligible for the NRHP in 2000 by the Keeper of the National Register, and the Fredericksburg I Battlefield (VDHR ID# 111-5295). For the purposes of applying Section 106 to the Rappahannock River Crossing project, the VA SHPO has agreed with VDOT that the appropriate historic property boundary for the battlefield is the potential National Register boundary defined by the American Battlefield Protection Program as shown in **Figure III.6 - Maps 1 and 2**.

Further Consultation

VDOT will undertake further consultation with the VA SHPO and other consulting parties to the Section 106 process to assess the effects of the Rappahannock River Crossing project on the Rappahannock Navigation System and the Fredericksburg I Battlefield and to conclude the Section 106 process by addressing any adverse effects. VDOT believes that adverse effects on the Rappahannock Navigation System can be avoided by designing the project so that any piers needed to support the two proposed C/D bridges are positioned to eliminate direct impacts to the canal system. Project construction can also be managed so that any equipment access on or across the remains of the canal system is avoided or minimized. The project area is located at the far western edge of the historic property boundaries of the Fredericksburg 1 Battlefield. This section of the battlefield is far removed from where known fighting occurred during the battle, and the battlefield's integrity of historic setting and feeling in this area has already been diminished by existing Interstate 95 and other modern disturbances. Additionally, the historic property surveys VDOT conducted within the project's APE identified no above-ground or archaeological resources associated with the battle that would be directly impacted by the project. For these reasons, VDOT believes that the project will not have an adverse effect on the Fredericksburg I Battlefield.



H. AIR QUALITY

To demonstrate the potential effect of the project on air quality, a quantitative assessment of carbon monoxide (CO) concentrations was performed using computerized emissions and dispersion models. CO emissions were calculated using EPA's Motor Vehicle Emission Simulator (MOVES2010b) model. Specific modeling inputs including vehicle age distribution, fuel type and technologies were obtained from the VDEQ and VDOT air quality staff. In addition, the roadway grade information required for input into MOVES2010b was estimated based on a combination of resources including: profiles developed in conjunction with the proposed improvements, U.S. Geological Survey (USGS) elevation data from Geographic Information System (GIS) files, and/or USGS contour mapping to represent the terrain along and adjacent to the study area. Additionally, the project is best characterized as higher potential MSAT effects, therefore requiring a quantitative analysis conducted in accordance with regulations and guidance from EPA and FHWA.

Based on the results of the air quality analysis, CO concentrations with the Build Alternative are predicted to be well below the NAAQS in both the Opening Year (2020) and Design Year (2040). Therefore, because projected CO levels are below the NAAQS under Build conditions, no exceedances are anticipated as a result of the proposed project and no mitigation measures are required.

Additionally, the City of Fredericksburg, Stafford and Spotsylvania Counties have been designated as attainment for $PM_{2.5}$, and as a maintenance area for the 8-hour Ozone (1997) standard, for which conformity was revoked as of July 20, 2013, therefore the project is not subjected to transportation conformity requirements. In addition, at the project level, no analysis is required for $PM_{2.5}$ as part of the air quality assessment since the project was not found to be a project of air quality concern based on the March 2006 Final Rule. The project has been determined to be a project characterized as having higher potential MSAT effects due to the project involving the creation of new or additional capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the average annual daily traffic (AADT) is projected to be in the range of 140,000 to 150,000 or greater by the design year. In addition, this project is also located in proximity to populated areas. Although the potential exists for localized increases in MSAT emissions, total MSAT emissions would be substantially lower in future years due to fleet turnover and the implementation of EPA's vehicle and fuel regulations.

The temporary air quality impacts from construction are not expected to be significant. Construction activities are to be performed in accordance with VDOT's current Road and Bridge Specifications.

Finally, the project is not expected to cause or contribute to any violations of the NAAQS or to interfere with the attainment or maintenance of the applicable NAAQS.

I. NOISE

A preliminary noise analysis was conducted in accordance with FHWA's *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR 772) and VDOT's *Highway Traffic Noise Impact Analysis Guidance Manual*. The FHWA regulations established NAC for various land use categories. The NAC are noise levels (measured in decibels, denoted as dB(A)) for each land use category that represent the threshold at which noise impact is considered to occur.

For the purposes of the preliminary noise analysis, the project study area was divided into 11 areas of common noise environments (CNEs). CNEs are groupings of receptor sites that, by location, form distinct communities within the project study area and contain receptors with similar exposures to noise. These areas are used to evaluate traffic noise impacts and potential noise abatement options for communities as a whole and to assess the feasibility and reasonableness of possible noise abatement measures for those areas. The CNEs contain 192 receptor locations, which are comprised of nine monitoring sites and 183 "modeling-only" sites.

If noise levels are predicted to "approach" or "exceed" the absolute FHWA/VDOT NAC for the design year build scenario at any receptor, then an impact is said to occur and a noise abatement evaluation is warranted. The absolute NAC for most land uses (Category B) along the corridor is 67 dB(A). VDOT defines "approach" as being within 1 dB(A) of 67 dB(A); therefore, the criterion can actually be considered 66 dB(A). Furthermore, VDOT noise policy also considers noise abatement for land uses that are predicted to experience at least a 10 dB(A) increase when comparing existing to design year build conditions. The noise analysis indicates that design year build noise levels are predicted to exceed the NAC at a total of 45 receptors within seven CNEs representing 77 residences, two playgrounds, one outdoor seating area, and one hotel patio. Barriers were evaluated within each of these CNEs, which is further described in the **Preliminary Noise Analysis Technical Report**. Two noise barriers (D and G1) were found to be not

feasible based on projected noise reductions and insertion losses, while four noise barriers (B, F, G2, and K) were found to be feasible but not reasonable based on barrier cost. Two noise barriers (C and E), benefitting CNEs C and E, were determined to be feasible and reasonable, and are shown on **Figure III.7**. These CNEs include three of the community resources described in **Table III.5**: Bragg Hill Family Life Center, Heritage Park I and Heritage Park II.

This information is based on a preliminary noise evaluation. A more detailed review will be completed during the final design stage. As such, noise barriers that are found to be feasible and reasonable during the preliminary noise analysis may not be found to be feasible and reasonable during the final design noise analysis. Similarly, noise barriers that were not considered feasible and reasonable may be found to meet established criteria and be recommended for construction. If a noise barrier is determined to be feasible and reasonable in final design, the affected residents and property owners will be given an opportunity to decide whether they are in favor of construction of the noise barrier. Additional details on the noise analysis can be found in the *Preliminary Noise Analysis Technical Report*.

J. HAZARDOUS MATERIALS SITES OF POTENTIAL CONCERN

The footprint of the Build Alternative was assessed for the presence of known hazardous material sites using both the Environmental Data Resources (EDR) database and various other databases associated with the EPA, including the Resource Conservation and Recovery Act Information (RCRAInfo) and the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). As depicted in **Figure III.8**, there are a total of 14 sites located within the vicinity of the project. Four of those sites are located within the project study area. These sites are: The Pep Boys, Star Enterprise, a Texaco storage tank location, and a Wawa. The Star Enterprise and Texaco sites have been closed and there have been no further violations documented for the past three years. The Wawa opened on January 17, 2014, and there have been no violations noted for this site. There have been no other violations noted, and there is no current compliance required with the RCRA. Of these four sites, Star Enterprise, the Texaco storage tanks' location, and the Wawa are within the potential impact area. Efforts would be made to avoid or minimize impacts to these sites.

Prior to construction, a Hazardous Materials Survey (following ASTM E1527-13 standards for Phase I Environmental Site Assessments) that covers the proposed project new right-of-way should be completed. In the event that recognized environmental conditions (RECs) are identified during the Hazardous Materials Survey and depending on the final alignment and/or drainage and utility improvements, Phase II Environmental Site Assessment activities may be necessary to identify and delineate impacted media that could adversely affect the project.

K. INDIRECT AND CUMULATIVE EFFECTS

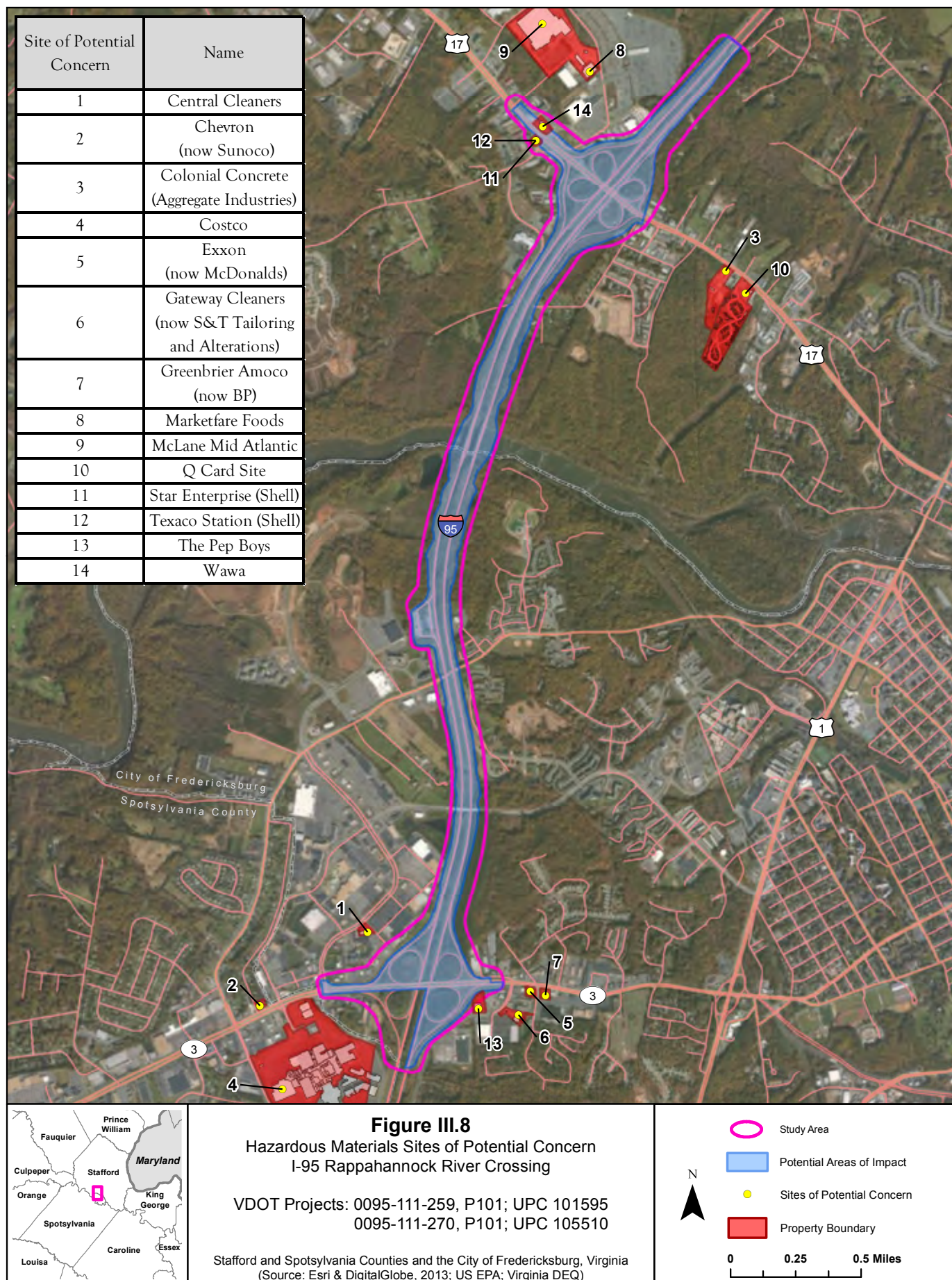
Indirect Effects

The Council on Environmental Quality (CEQ) defines indirect effects as effects that "...are caused by the [proposed] action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8(b)).

The most common indirect effects associated with transportation projects are related to development and the impacts of such development that would not otherwise occur if the project were not constructed. The local governments in the project study area have identified goals for their regions, one of which is to support existing and future economic development. Consequently, any development that occurs would need to be consistent with county, state and/or federal policies, plans, and regulations.

Although the study area is highly urbanized, land use also includes a mix of forested lands and open space, including a number of wetlands areas associated with and including the Rappahannock River. The study area also includes the disturbed/mixed use lands surrounding the I-95, US 17, and VA 3 highway corridors.

Future development plans for the properties within the project study area were researched and analyzed. As a result, several planned projects were identified, including development as a part of Celebrate Virginia North and Stafford County's Southern Gateway UDA. These planned projects are included in various



transportation planning documents and would occur regardless of the decision for either the No-Build or Build Alternative. As previously described, adjacent to the redevelopment area is Celebrate Virginia, a 2,400 acre project being designed as a retail and tourism hub. It includes more than two million square feet of retail, a Corporate Campus offering up to three million square feet of office space, a golf club, and an adult living community. A section of this planned development is currently under construction in the northern portion of the development in the vicinity of Celebrate Virginia Parkway. Additional planned efforts include the Rappahannock Parkway, a proposed limited access toll road and interchange from Interstate 95, to facilitate access to Celebrate Virginia in the City of Fredericksburg, which is included in FAMPO's 2040 Long Range Transportation Plan³ and would improve access to this development. Stafford County's Southern Gateway UDA encompasses the northern part of the study area. This UDA consists of approximately 864 acres and is a portion of the Southern Gateway Redevelopment Area, which is planned for a mix of uses following the concepts of a traditional neighborhood design with 3,674 dwelling units and 2,670,456 square feet of commercial buildings.⁴ Additional development beyond what is already planned by Stafford County is not expected to occur due to the project.

Indirect impacts also include those that are further removed in time or space from direct effects. Such impacts may include water quality (e.g., stormwater runoff) or floodplain effects that result from the construction of the project. Indirect effects may be those resulting from the associated use of the roadway and increased impervious area, as well as maintenance and storm water runoff carrying particulates, metals, oil and grease, organics, nutrients and other substances. Indirect effects have the potential to affect aquatic life in the Rappahannock River and other stream systems. Land-disturbing activities may expose large areas of soil that could be eroded by wind and rain. Vegetation and naturally occurring soil stabilizers are sometimes removed, leading to an increase in sedimentation in surface water. Appropriate regulations would be followed to minimize these effects. The appropriate and applicable erosion and sediment control measures and Best Management Practices (BMPs) would be incorporated into the design and construction of the Build Alternative. For this reason, it is anticipated that indirect effects to surface and groundwater resources would be minimal for the Build Alternative.

It is anticipated that the Build Alternative would impact WUS, including wetlands. Total direct impacts are discussed in the **Natural Resources Technical Report**. Some examples of potential indirect impacts to WUS, including wetlands, can include future runoff affecting water quality, either due to materials washing off

the road surface or due to increased potential for sedimentation caused by concentration of runoff; disruption of hydrology that supports aquatic resources; and possibly decreasing their value to wildlife. However, due to the adherence to strict controls for design and construction of the project, the effects to water quality, either due to materials washing off the road surface or due to increased potential for sedimentation caused by concentration of runoff, is anticipated to be minimal.

Other reasonably foreseeable indirect effects would be to community resources and area populations. These effects are expected to be beneficial and would include improved mobility and access to community facilities, businesses, and neighborhoods.

Cumulative Effects

The CEQ defines cumulative impacts as "...impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Only those environmental resources that would be directly or indirectly affected by implementation of the Build Alternative could incur cumulative effects from the alternative in combination with other actions.

In determining cumulative effects, the past, present and future activities were reviewed in conjunction with potential project effects on notable features. There are a number of planned projects that are currently included in the assumptions for the No-Build Alternative, including the extension of the I-95 Express Lanes in the median of I-95 and the Fall Hill Avenue Bridge Replacement project, which will be widened to four lanes and provide room for the proposed I-95 northbound and southbound collector-distributor roads proposed with the Build Alternative. The No-Build Alternative is not expected to substantially alter development patterns within the study area; therefore, it is not anticipated to contribute to the cumulative impacts of any natural resources or historic properties evaluated as part of this study.

The Build Alternative is expected to add incremental impacts to the overall cumulative effects of past and future actions to each of the resources considered; those impacts are expected to be both positive and negative. Below is a discussion of the potential cumulative effects on the impacted resource areas evaluated in this EA.

³ 2040 FAMPO Long Range Transportation Plan, Appendix D: Highway Needs Plan Projects Interstate Highway Needs, Adopted April 15, 2013.

⁴ Comprehensive Plan 2010 - 2030, Stafford County, Virginia, Chapter 3: The Land Use Plan, December 14, 2010.

Socioeconomics and Land Use

- As envisioned in the Comprehensive Plans for the City of Fredericksburg, Spotsylvania County, and Stafford County, future development in the region would be focused into areas that can support new development or are in need of redevelopment and away from areas that cannot support new growth. By focusing future growth and supporting transportation improvements, the area would be able to grow in a manner that promotes continued access and mobility and that enhances the quality of life for residents and employees, thus limiting potential adverse cumulative effects to the social and economic resources, including land uses, within the study area.

Environmental Justice

- The entire length of the project corridor includes minority and low income EJ communities. As a result of this project and the ongoing and proposed development efforts for the region, cumulative effects are inevitable. Although direct impacts to EJ populations are minimal from this project, other nearby projects may contribute to additional impacts. However, benefits are also anticipated to result from this development, which would provide for increased mobility, better access to transit, greater employment opportunities and enhanced connection to community resources. As described in the previous Socioeconomics and Land Use discussion, the region's growth plans are in place in an attempt to enhance the quality of life for the area's populations which would limit potential adverse cumulative effects to the EJ communities with the project study area.

Section 4(f) Resources, including Parks and Recreational Facilities and Historic Properties

- Impacts to Section 4(f) resources are expected to be avoided or minimized to the greatest possible extent as required by the Section 4(f) legislation, thus limiting potential adverse cumulative effects.

Natural Resources, including Wetlands, Waterways, Water Quality and Threatened/Endangered Species

- It is anticipated that a Section 404 permit from the Corps, a VWP General Permit from the VDEQ, and a Subaqueous Bottomlands Permit from the VMRC would be required, and therefore the effects to natural resources would be considered during final design and construction. The permitting process, including the related federal and state regulations, would limit potential adverse cumulative effects to natural resources.

Noise

- A Final Design Noise Analysis will be completed during the design phase if the Build Alternative is selected. As part of that analysis, noise impacts will be evaluated and noise barriers that are warranted, reasonable and feasible will be identified and potentially constructed, pending coordination with the affected residents and property owners. Therefore, any additional noise would be mitigated, thus limiting potential adverse cumulative effects.

In examining the cumulative effects of the project with past, present and reasonably foreseeable future actions, it was determined that contributions to substantial effects to these resources are not anticipated and therefore the Build Alternative is not expected to substantially contribute to adverse cumulative impacts. When considered along with other development, beneficial cumulative impacts could occur to resources that are directly affected by the Build Alternative. This includes improved mobility and access for study area businesses and residents.

L. CONSTRUCTION

During construction, temporary environmental impacts would be controlled, minimized, or mitigated through adequate and prudent construction practices and methods. Potential temporary construction impacts and preventive practices are summarized below.

Late Discoveries

During construction, should the discovery of archaeological, paleontological, or rare mineralogical articles occur, work would be suspended immediately. VDOT's 2007 *Road and Bridge Specifications* establish the protocol that would be followed should a "late discovery" occur.

Water Quality

During construction, non-point source pollutants could possibly enter groundwater or surface water from stormwater runoff. To minimize these impacts, appropriate erosion and sediment control practices would be implemented in accordance with VDOT's *Road and Bridge Specifications*. These specifications also prohibit contractors from discharging any contaminant that may affect water quality. In the event of accidental spills, the contractor is required to immediately notify all appropriate local, state, and federal agencies and to take immediate action to contain and remove the contaminant.

Air

Air quality impacts from construction, consisting of emissions from diesel-powered construction equipment, burning of debris, and fugitive dust, would be temporary. This project will comply with all applicable local, state, and federal regulations, including the Virginia Environmental Regulations 9 VAC 5-40-5600 *et seq.* regarding open burning and 9 VAC 5-50-60 *et seq.* regarding fugitive dust emissions. To control dust, measures would be taken to minimize exposed earth by stabilizing with grass, mulch, pavement, or other cover as appropriate.

Noise

Construction activity may cause temporary, intermittent fluctuations in noise levels. Based on review of the project study area, no substantial long-term construction noise impacts are anticipated. During the construction phase of the project, reasonable measures would be taken to minimize noise impacts and disturbance from construction-related activities. VDOT's *Road and Bridges Specifications* establish construction noise limits that the contractor must adhere to in order to limit construction noise impacts.

Solid Waste and Hazardous Materials

Solid waste material resulting from clearing and grubbing, demolition, or other construction operations would be removed and disposed of in accordance with applicable regulations and/or special provisions. The presence of hazardous materials or petroleum-impacted soils on properties to be acquired for the project would be addressed through coordination with existing property owners, regulatory agencies, and/or the development of special provisions for management of hazardous materials during construction. If undocumented hazardous materials are discovered during construction, a plan designed to mitigate the impact of the hazardous materials would be developed and instituted.

IV. COMMENTS AND COORDINATION

A. AGENCY COORDINATION

In preparing this document, the federal, state and local agencies listed below were contacted to obtain pertinent information and to identify key issues regarding potential environmental impacts. The private entities listed below also were part of the scoping process.

- United States Environmental Protection Agency, Region III, Environmental Programs Branch
- National Oceanic and Atmospheric Administration, National Marine Fisheries Services, Habitat Conservation Branch
- United States Department of Agriculture, Natural Resources Conservation Service, Chesapeake Office
- United States Army Corps of Engineers, Norfolk District
- United States Department of Homeland Security, United States Coast Guard, Fifth Coast Guard District
- United States Department of Housing and Urban Development
- United States Department of the Interior, Office of Environmental Project Review
- United States Department of the Interior, Fish and Wildlife Service
- United States Department of the Interior, National Park Service, Fredericksburg-Spotsylvania National Military Park
- Virginia Department of Agriculture and Consumer Services
- Federal Railroad Administration
- Federal Transit Administration
- Virginia Department of Aviation
- Virginia Department of Conservation and Recreation
- Virginia Department of Environmental Quality
- Virginia Department of Forestry
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Health, Office of Drinking Water Programs
- Virginia Department of Historic Resources
- Virginia Department of Housing and Community Development
- Virginia Department of Mines, Minerals and Energy
- Virginia Department of Rail and Public Transportation
- Virginia Economic Development Partnership
- Virginia Institute of Marine Science
- Virginia Marine Resources Commission
- Virginia Outdoors Foundation
- American Battlefield Protection Program
- Spotsylvania County
 - Planning Department
 - Board of Supervisors
 - County Administrator
 - Parks and Recreation Department
 - Zoning Department
 - Utilities/Public Works Department
 - Public Schools
- City of Fredericksburg
 - City Manager
 - Public Works Department
 - Planning Commission
 - Community Planning Department
 - Parks and Recreation Department
 - Board of Zoning Appeals
 - Public Schools
- Stafford County
 - County Administrator
 - Board of Supervisors
 - Public Works Department
 - Planning and Zoning Department
 - Utilities Department
 - Parks and Recreation Administration
 - Public Schools
 - Geographic Information Systems Department
 - Historical Society
- Fredericksburg Area Trail Management and User Group
- Fredericksburg Area Mountain Bike Enthusiasts
- Patawomeck Indians of Virginia
- Historic Fredericksburg Foundation
- Friends of the Rappahannock

B. PUBLIC INVOLVEMENT

VDOT will hold a Location Public Hearing to present the findings of this Environmental Assessment (EA). The EA will be available for public inspection prior to and at the hearing, and there will be a minimum 30-day public comment period following notice of availability of the EA. Any comments received during the public hearing or comment period will be considered.

Appendix A

New Interstate Access Request Letter
from FHWA, dated April 28, 2011





U. S. Department
of Transportation
**Federal Highway
Administration**

Virginia Division
(804) 775-3320

400 N. 8th Street, Rm. 750
P. O. Box 10249
Richmond, VA 23240

April 28, 2011

Re: New Interstate Access
Request: I-95 between U.S. Route 3
and the Rappahannock River City of
Fredericksburg

Mr. Malcolm T. Kerley, P.E.
Chief Engineer
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219-2000

Dear Mr. Kerley:


We have reviewed the subject Interchange Justification Report (IJR) package received on January 4, 2011. Based on an engineering and operations review, we concur that the proposed new access point to I-95 between U.S. Route 3 and the Rappahannock River is acceptable. Final approval of the new access point and interchange proposal may be given upon completion of the environmental process and other work noted below.

The new access proposal includes a full interchange connection with Interstate I-95 between the Virginia Welcome Center and the Rappahannock River that provides access to the west to U.S. Route 3 via a new connector road. This new interchange requires the construction of directional and semi-directional ramps and flyovers to provide access to and from northbound and southbound I-95. The new access proposal also requires construction of additional connecting lanes across the Rappahannock to existing I-95/U.S. Route 17 Interchange that would also require major reconstruction. Our analysis concludes that construction of all infrastructure elements presented in the proposal is vital in ensuring appropriate and successful operation of the new access point and Interstate I-95. Thus, when requesting federal-aid participation for this project and related activities please ensure that all project phases are included in the State Transportation Improvement Plan (STIP), the Six Year Improvement Program (SYIP), and, for those projects beyond the timeframe considered by the STIP and SYIP, the fiscally Constrained Long Range Plan (CLRP).

Please also note that while we consider the proposed tie-in of the new connector road with U.S. Route 3 in the western terminus of the project as a design concept that may be operationally acceptable, this concept was not studied or analyzed against other alternatives to the same depth and detail as the rest of the proposal. In moving forward, VDOT would need to consider other alternatives and innovative designs are further developed and evaluated so that the most safe,

operationally efficient, and desirable connection is implemented. If there are any questions on this matter, please feel free to contact me at (804)775-3320.

Sincerely yours,


For: Irene Rico
Division Administrator

cc: Mohammad Mirshahi, P.E.
Quintin Elliot





COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219-2000

Gregory A. Whirley
Commissioner

December 20, 2010

I-95 Access Study
New Access to I-95
Between Route 3 and the Rappahannock River
City of Fredericksburg
Re: Request for New Access to I-95

Ms. Irene Rico
Division Administrator
Federal Highway Administration
P.O. Box 10249
400 N. 8th Street Room 750
Richmond, Virginia 23240-0249

Attn: Mr. Daniel Camacho, P.E.

Dear Ms. Rico

RECEIVED

FEDERAL HIGHWAY ADMINISTRATION

JAN - 4 2011

VIRGINIA DIVISION OFFICE
RICHMOND, VIRGINIA

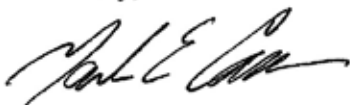
Attached is an Interchange Justification Report (IJR) requesting new access to Interstate I-95 in the City of Fredericksburg. This report was prepared by Michael Baker, Jr., Inc., a consultant hired by the George Washington Regional Commission (GWRC) and the Fredericksburg Area Metropolitan Planning Organization (FAMPO) for the development of an access study to identify alternatives to address congestion along Interstate I-95 in the Fredericksburg area. This study project and the proposed interchange improvements have been endorsed by FAMPO.

The proposed new access to Interstate I-95 provides a new full access interchange, providing access to the west only, between the Virginia Welcome Center and the Rappahannock River. The preferred alternative also provides for two new, two-lane, structures, one in each direction, over the Rappahannock River, parallel to the existing structures, and improvements to the U.S. Route 17 interchange in Stafford County. The project will also construct a four to six lane limited access connector road from the new interchange to the Route 3/Gordon Road intersection in Spotsylvania County, which will provide alternate access to the commercial developments in the area.

Ms. Rico
December 20, 2010
Page 2

The Virginia Department of Transportation has reviewed the Interchange Justification Report and has worked closely with the GWRC and FAMPO and with Michael Baker and your office throughout the development of this document. The Department concurs with and supports the findings presented in this IJR. We look forward to your review and approval of this Interchange Justification Report. Following your approval of the Engineering and Operational Acceptability of the proposed new access point, FAMPO will begin the NEPA process and obtain environmental clearance leading to formal approval of the IJR. Please provide your approval of the Engineering and Operational Acceptability of the proposed new access point, If you have any questions or comments, please contact Richard C. Worssam, PE, at the address listed above.

Sincerely,



for Malcolm T. Kerley, P.E.
Chief Engineer

Approved: _____ Date _____

cc: Mohammad Mirshahi, P.E.
Quintin Elliot

Appendix B

Bridge Memorandum





Memorandum

TO: Brennan S. Collier, McCormick Taylor, Inc.

FROM: Chang H. "David" Chung, P.E., McCormick Taylor, Inc.

DATE: May 20, 2015

SUBJECT: I-95 Rappahannock River Crossing Project
Bridge Memorandum
VDOT Project Numbers: 0095-111-259, P101; UPC No. 101595 and
0095-111-270, P101; UPC No. 105510

As a part of the Environmental Assessment being prepared for the I-95 Rappahannock River Crossing Location Study, McCormick Taylor, Inc., (MT) conducted additional bridge studies and evaluated potential conceptual span configurations, superstructure alternates and constructability issues for the planned Collector Distributor (C/D) lanes over the Rappahannock River. The sole purpose of these studies was to demonstrate the potential impacts to and/or possible avoidance of the existing historic Rappahannock Navigation (Canal) and Canal Lock #1/ Minor's Lock for use during Section 106 consultation with the Virginia Department of Historic Resources. In addition, this information is being used to assist in determining potential impacts to Section 4(f) resources within the vicinity of the Rappahannock River. This memorandum summarizes the additional evaluations that were conducted and depicts possible span configurations and construction layouts that could be considered during future design efforts. However, they are only conceptual and are not intended to be representative of the final condition. The final bridge configuration and means and methods of constructing the C/D bridges will be determined during final design and construction.

The project bridges (southbound & northbound) are located along I-95 between Exits 130 (VA 3 interchange) and 133 (US 17 interchange), positioned approximately 1.2 miles north of the VA 3 interchange. These bridges cross over the Rappahannock River connecting Stafford and Spotsylvania counties through the City of Fredericksburg, VA (see attached Project Location Map).

A field review was made by McCormick Taylor personnel on 12/2/2014 to assess the existing bridges, site condition and terrain and to identify potential challenges involving constructability of the new bridges that will carry the C/D lanes between interchanges at VA 3 and US 17.

This memorandum will evaluate conceptual bridge options for the proposed C/D lane bridges and document the feasible bridge configurations. The bridge configurations will consist of span layout to determine possible substructure locations and a typical superstructure type (i.e., steel beams or prestressed concrete beams) that will span between the substructure units. It is important to note that no engineering designs or analysis were performed to develop the bridge concepts; rather, professional engineering expertise along with experience from past similar projects was used.

It is anticipated that the proposed profile of the new bridges will be set approximately at the same elevations as the existing bridges. This will place the new bridges along a vertical sag curve with vertical tangents of -3.57% and +3.11%. The horizontal alignments of the bridges are expected to be located on a tangent.

The preliminary evaluation of the span layout options considers the impacts to the existing waterway, existing historic resources (canal and lock under southern approach spans), and constructability of the proposed bridges. Based on these constraints, we have evaluated two feasible span layout options. It should be noted that additional factors and provisions related to installation of the new substructure units will need to be coordinated with Virginia Department of Historical Resources (VDHR)/Virginia Department of Transportation (VDOT) on a later date to ensure that the historic resources are not impacted by the bridge construction.

Span Layout 1 (see Figure 1, "Span Layout Plan – 1")

Southbound: South approach spans 1 and 2 will be 90' long; spans 3, 4 and 5 will be 120' long; spans 6 through 8 are anticipated to be approximately 135' long; spans 9 through 11 are anticipated to be approximately 117' long. This span layout will generate 11 spans with an approximate total length of 1,300'.

Spans 1, 2 and 3 are configured to minimize disturbance to the existing canal and lock archaeological site located on the southern bank side, where span 3 spans over this cultural resource area. The size of the proposed bridge pier footings is estimated, based on the existing bridge pier footing information, to be approximately 20' x 30'. This provides minimum clearance of approximately 23'-9" from the approximate edge of footing of Pier 3 to the edge of canal remnant. Other spans are configured to have similar span lengths as the adjacent existing I-95 southbound bridge.

Northbound: North approach spans 1 and 2 will be 90' long; spans 3, 4 and 5 will be 120' long; spans 6 through 9 are anticipated to be approximately 135' long. This span layout will generate 9 spans with an approximate total length of 1,080'.

Similar to the *Southbound* span layout, the first three spans are configured to minimize disturbance to the existing canal and lock archaeological site located on the southern bank where span 3 spans over this cultural resource area. Based on the estimated footing size of 20' x 30', the minimum clearance of approximately 17' is provided from the edge of pier 3 to the edge of projected canal path. Other spans are configured to have similar span lengths as the adjacent existing I-95 northbound bridge.

Both the southbound and northbound proposed bridge span configurations are limited to an approximate maximum span length of 135'. This span length can easily be accommodated through the use of typical prestressed concrete beams or steel plate girders.

Span Layout 2 (see Figure 2, "Span Layout Plan – 2")

Southbound: Approach span 1 will be 135' long; spans 2 through 4 will be 270' long; span 5 will be 235' long; span 6 will be 117' long. This span layout will generate 6 spans with an approximate total length of 1,300'.

Span 2 is configured to minimize the disturbance to the existing canal and lock archaeological site located on the southern bank, where span 2 spans over this cultural resource area. The sizes of the proposed pier footings are estimated, based on the existing bridge pier footing information, to be approximately 30'x35' for piers 1 and 5 and 30'x40' for piers 2, 3 and 4. This provides minimum clearance of approximately 73' from the edge of pier 1 footing to the edge of projected canal path. Other spans are configured to have proposed piers aligned with the existing piers and minimize the number of proposed pier locations. The overall span length is similar to the adjacent existing I-95 southbound bridge.

Northbound: Approach spans 1 and 5 will be 135' long; spans 3, 4 and 5 will be 270' long. This span layout will generate 5 spans with an approximate total length of 1,080'.

Similar to the *Southbound* span layout, span 2 is configured to minimize the disturbance to the existing canal and lock archaeological site located on the southern bank. Based on the estimated footing size of 30'x35' at pier 1, a minimum clearance of approximately 59'-6" is provided from the edge of footing at pier 1 to the edge of projected canal path. Other spans are configured to have proposed piers aligned with the existing piers and minimize the number of proposed pier locations. The overall span length is similar to the adjacent existing I-95 northbound bridge.

Both the southbound and northbound proposed bridge span configurations are limited to an approximate maximum span length of 270'. This span length eliminates the use of typical prestressed concrete beams used by VDOT as they are limited to an approximate span length range of 150'.

Evaluation of Superstructure Alternates

In order to accommodate the previously discussed span layout options, the following beam types were considered:

- Superstructure Alternate 1 - Prestressed Concrete Bulb-T's (Ref.: VDOT Design Manual of the Structures and Bridge Division, file no. 12.03-3)
- Superstructure Alternate 2 - Prestressed Concrete I-beams (Ref.: VDOT Design Manual of the Structures and Bridge Division, file no. 12.04-3)
- Superstructure Alternate 3 - Steel Plate Girder

The specialty superstructure types such as truss, cable-stayed, segmental and suspension bridges were not considered for this memorandum.

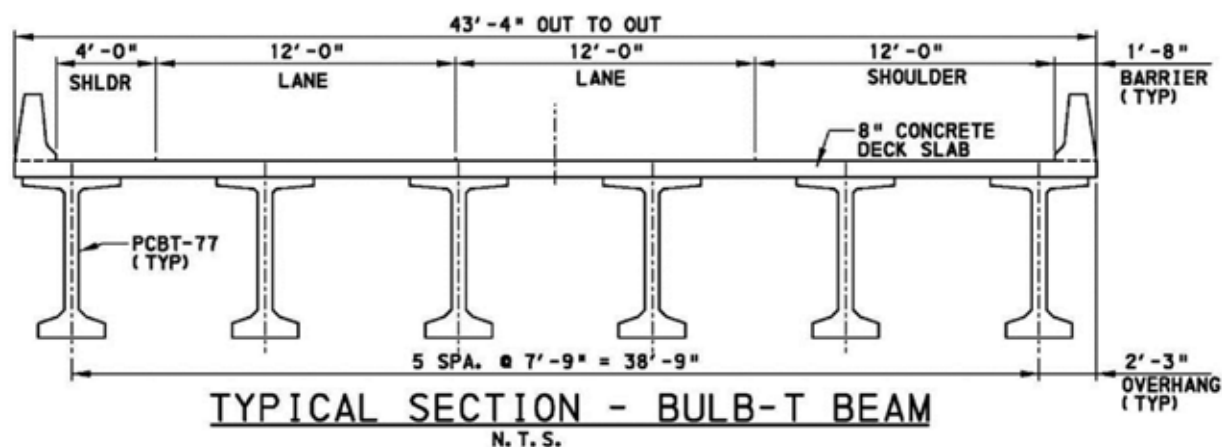
Superstructure Alternate 1 – Prestressed Concrete Bulb-T Beams: Preliminary evaluation of the layout indicates that this alternate will consist of six (6) pre-stressed concrete Bulb-T beams spaced at 7'-9". Based on the *Preliminary Bulb-T Design*

Tables (Ref.: VDOT Design Manual of the Structures and Bridge Division, file no. 12.03-11), the estimated beams will be PCBT-77 (77" deep with $f'_c = 7,000$ psi). These beams will be composite with an 8" thick reinforced concrete deck slab. The expected deck overhang is 2'-3". See *Sketch B* for typical section of the superstructure.

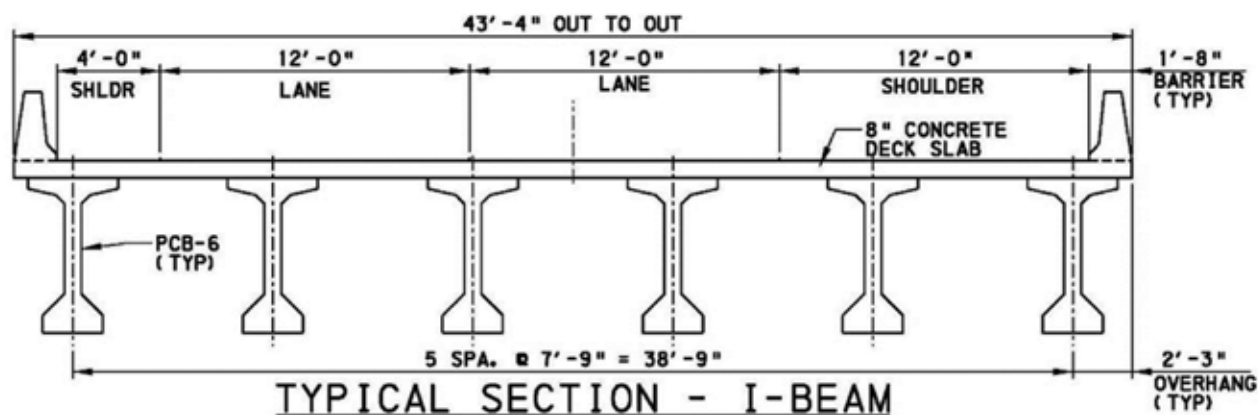
As mentioned in the span layout options, this superstructure type can accommodate the span configuration shown on **Figure 1**.

Superstructure Alternate 2 - Prestressed Concrete I-beams: Preliminary evaluation of the layout indicates that this alternate will consist of six (6) pre-stressed concrete I-Beams spaced at 7'-9". Based on the *Preliminary I-beams Design Tables* (Ref.: VDOT Design Manual of the Structures and Bridge Division, file no. 12.04-11), the estimated beams shall be PCB-6 (72" deep with $f'_c = 8,000$ psi). These beams will be composite with an 8" thick reinforced concrete deck slab. The expected deck overhang is 2'-3". See *Sketch C* for typical section of the superstructure.

As mentioned in the span layout options, this superstructure type can accommodate the span configuration shown on **Figure 1**.



Sketch B



Sketch C

Superstructure Alternate 3 – Plate Girders: Preliminary evaluation of the layout indicates that this alternate will consist of six (6) steel plate girders spaced at 7'-9". Based on the preliminary estimates the steel plate girder is expected to be approximately 66" deep for 135'-0" span and 120" deep for 270'-0" span. The steel plate girders may be constructed from 50 ksi steel, 70 ksi or 100 ksi (high performance steel). The girders will be composite with an 8 1/2" thick reinforced concrete deck slab. The expected deck overhang is 2'-3". See *Sketch D* for typical section of the superstructure.

As mentioned in the span layout options, this superstructure type can accommodate the span configurations shown on Figure 1 and on Figure 2.

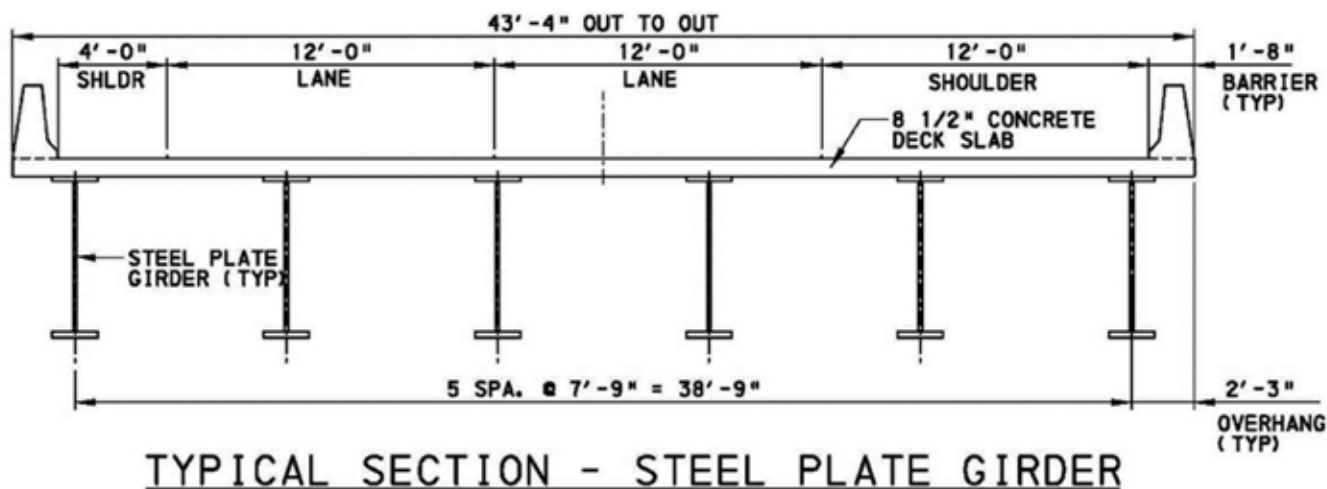
Substructure

Based on *Pier Details General Guidelines and Type Selection* from VDOT *Design Manual of the Structures and Bridge Division*, piers are anticipated to be hammerhead piers with either rectangular or rounded end columns. This type of pier can be designed to

accommodate span lengths from 135' to 270', which can support either prestressed concrete beams or steel plate girders. This hammerhead type pier will have similar appearance as the existing piers.

In addition, based on the review of the existing bridge drawings and our field view, it is anticipated that the proposed foundations type will be spread footings founded on rock, similar to the existing I-95 bridges. The sizes of the proposed spread footings are estimated from the existing I-95 bridges. The estimated minimum clearance between the edges of the footings and canal and lock is shown on Figures 1 and 2 for the two span layout options. Estimated spread footing size was used to determine the minimum clearance between the footings and canal and lock because the spread footings would yield larger foot print over other foundation types, such as drilled caissons.

The final substructure type, size, location and configuration will be determined during final design and construction in coordination with VDHR, VDOT and FHWA.



N. T. S.

Sketch D

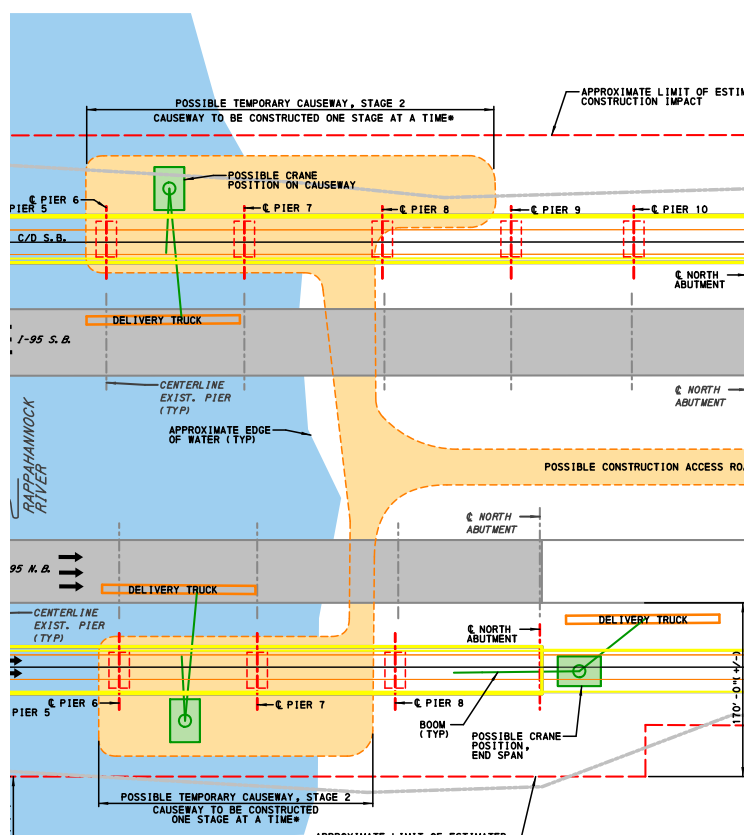
Constructability

Based on our field view and discovery of the existing historic resources (Navigation Canal and Canal Lock) under the southern approach spans (southern bank), the proposed bridges must be constructed in such a way that permanent and temporary impacts to cultural and environmental resources are avoided and/or minimized when feasible. Therefore, these areas must be fenced off to minimize disturbance and encroachment by the construction activities.

Based on our initial investigation, it is our opinion that the proposed bridges can be constructed with the use of properly sized crane(s) while providing access to below bridge areas at both northern and southern approaches. This will allow the contractor to maneuver equipment and position delivery trucks to construct the proposed bridges. The general schematics and estimated impact area to construct the proposed C/D lane bridges are depicted on the attached Figure 3.

As shown on Figure 3, on the southern side of the existing bridges, there is an existing Quarry Road (dirt road) that is used to access the quarry located in the southwest quadrant of the bridges. This access road is maintained by the City of Fredericksburg's Public Works Department and VDOT could negotiate the terms to use the Quarry Road for the contractor's equipment access and storage area. Otherwise, access could be provided from the top of I-95 near southern approach roadway embankments. However, this may require rock excavation as there are visible rock crops near the surface around the north and southbound abutments.

On the northern side of the existing bridges, approximately 4' of soil exists over decomposed granite, according to the information provided to us by VDOT. We believe one possible way to access below bridges is through re-grading the median area between the existing northbound and southbound bridges (See *Sketch E*, and for 11" x 17" print out, see attached Figure 3). This will require some rock excavation, much like the southern embankment side, if the use of Quarry Road cannot be negotiated between the VDOT and the City of Fredericksburg's Public Works Department. Because this project is anticipated to have extensive rock excavation related to the bridges' foundation work, the rock excavation required to construct an access road may not be as impractical when compared to performing rock excavation only for construction access road. Because it is anticipated that the two C/D lane bridges will be advertised for construction separately in the future, it is unknown if this access road in the median could be left in place for the construction of the other C/D lane bridge.



Sketch E - Northern Embankment

Another way to access the northern side of the existing bridges would be via the quarry roadway on the southern embankment side with a causeway across the entire Rappahannock River to access the northern embankment side of the river. Although the causeway can be constructed across the entire river, there may be some challenges related to obtaining permits to place a causeway across the entire river. Some of the concerns related to placing a causeway are discussed in the next paragraphs.

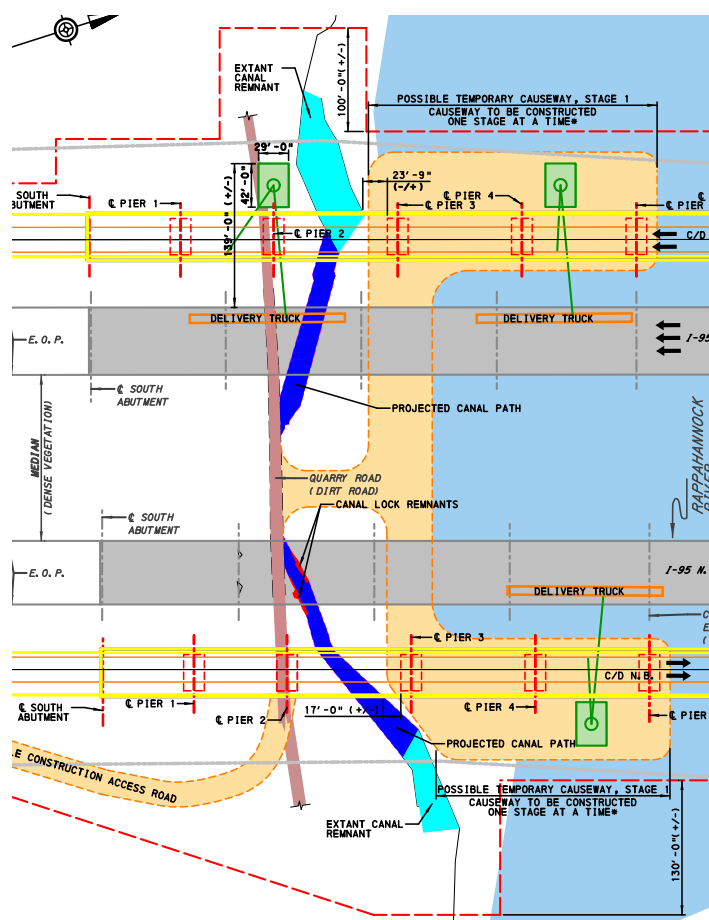
To gain access over the waterway, we expect the use of temporary causeways. We have done this for other bridges over waterways, and they have proven to be a cost effective solution. For the project bridges, temporary causeway could be constructed entirely across the Rappahannock River or in two stages to construct half of the causeway at a time. It is our opinion that a construction layout that will utilize the temporary causeway in two stages may be a better option at this time as it will have less of an impact on hydrology and Jurisdictional Waters of the U.S., and permitting may be viewed more favorably when compared to a causeway that spans across the entire Rappahannock River. This will minimize disruption to the Rappahannock River as half of the river will remain open at all times. The access point for the southern bank side, where the existing historic resources are found, is anticipated to be located between the projected canal paths and lock (See *Sketch F*, and for 11" x 17" print out, see attached Figure 3). This configuration allows access to the river piers and causeway without having to provide a temporary fill over the existing canal and lock, thereby minimizing the temporary and permanent impacts to the archaeologically sensitive area.

The size of the causeway must be designed to accommodate the design storm event, existing water flow and wildlife (fish run). In addition, a preliminary habitat survey for the dwarf Wedgemussel (an endangered species of mussel) recently has been completed, which noted that suitable habitat was present in the river to potentially support populations of the species. A mussel survey will be completed prior to construction to determine if the species is present and to relocate dwarf Wedgemussel individuals, should they be found to be contained within the limits of the project. Therefore, caution must be taken by the contractor to avoid impacts to the mussel and the historic sites. This also requires proper negotiation and coordination between VDOT and the permitting agencies to avoid impacts to the overall project schedule and cost. Our conceptual causeway configuration and access can be seen in the attached Figure 3. The construction of the footings for both Span Layout 1 and 2 can be achieved from either southern bank or causeways. For Span Layout 1, the closest footing appears to occur at pier 3 on northbound C/D lane bridge with clearance of approximately 17' and at pier 3 on southbound C/D lane bridge with clearance of approximately 23'-9" (see attached Figure 1). To construct these footings, we anticipate the excavation to be performed from the causeway near pier 3 of northbound C/D lane bridge and from the causeway near pier 3 of southbound C/D lane bridge. Although the final bottom of footing elevations is not yet known, we anticipate the use of a temporary shoring system in order to excavate for the footings and to avoid encroachment into the archaeologically sensitive areas.

For Span Layout 2, the closest footing appears to occur at pier 1 on northbound C/D lane bridge with clearance of approximately

59'-6" and at pier 1 on southbound C/D lane bridge with clearance of approximately 73' (see attached Figure 1). To construct these footings, we anticipate the excavation to be performed from the southern embankment side for both north- and southbound C/D lane bridges near pier 1. Because the minimum clearances are large, we do not anticipate the use of a temporary shoring system to excavate for the footings at this time. The traditional method of excavation should be sufficient to excavate for the footings while maintaining sufficient distance from the existing canal and lock, avoiding potential encroachment into these archaeologically sensitive areas.

With access to the below bridges available to the contractor, crane(s) can be placed below the bridge while the beam delivery trucks are parked on the existing I-95 bridge with temporary one lane closure during overnight or approved off-peak hours. The conceptual schematics of beam erection/picks can be seen on the attached Figures 3 and 4. We also anticipate that this temporary lane closure can be used for concrete delivery trucks to pump the concrete for pier and deck construction where access cannot be achieved from the approach roadways.



Sketch F - Southern Embankment

Conclusion

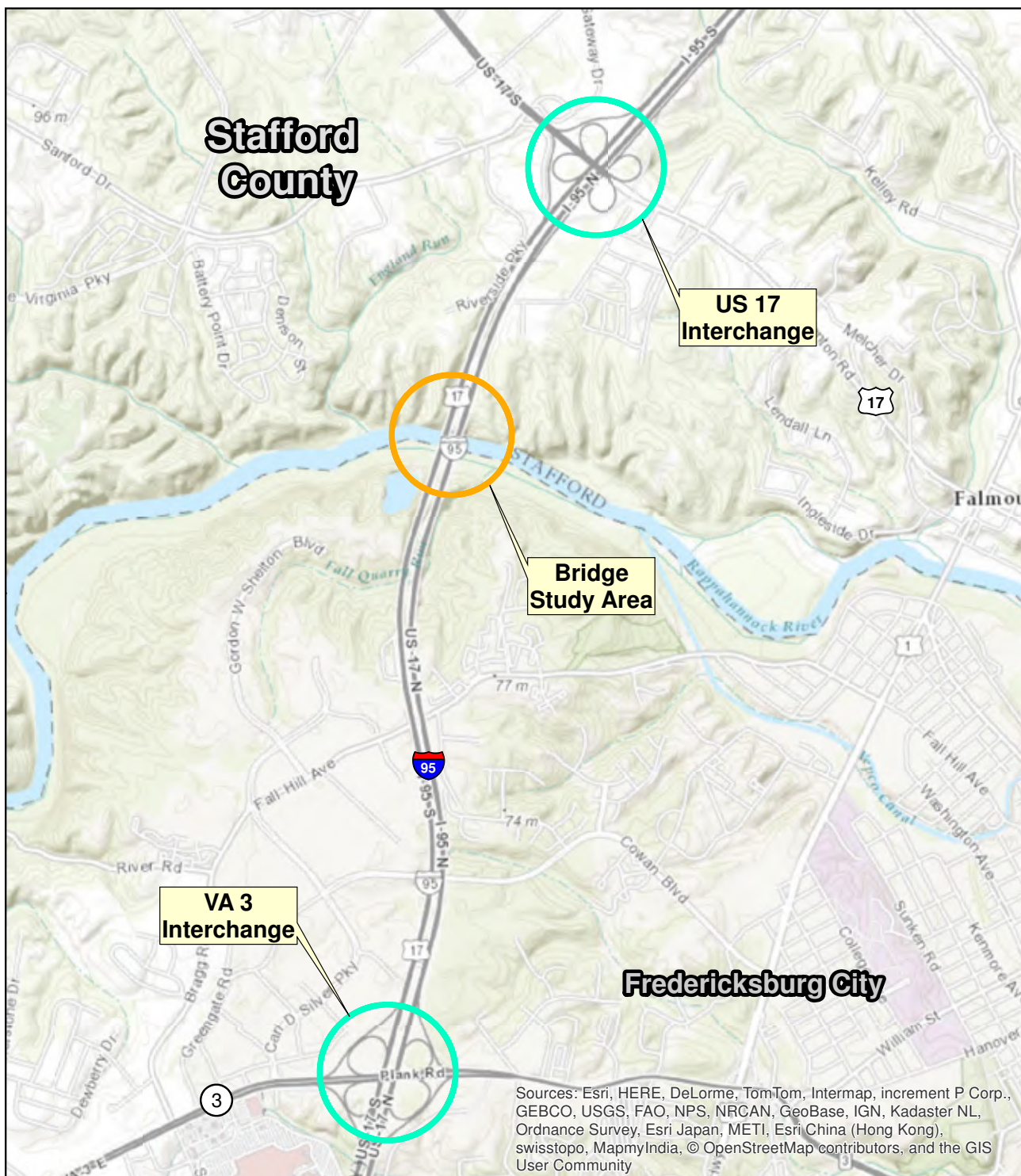
Based on our conceptual study, we believe the existing historic resources (Rappahannock Navigation and Canal Lock #1/Minor's Lock) can be spanned over to minimize any permanent or temporary impacts with the two span layout options presented in this memo (see **Figures 1 and 2**). These two span options can be accommodated with commonly available superstructure types, such as prestressed concrete beams and built-up steel beams. In addition, we believe these two span options can be constructed using the conceptual construction layout depicted in **Figure 3** to avoid and/or minimize permanent and temporary impacts to cultural and environmental resources.


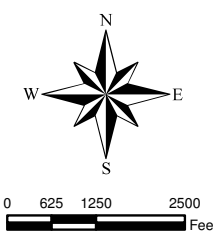
The conceptual Span Layout 1 presents the least amount of clearance (17' +/-) between the canal and lock and the estimate edge of footing (see **Figure 1**). This minimum clearance may require the contractor to utilize a temporary shoring system near piers 2 and 3 for north and southbound C/D lane bridges to minimize possible encroachment into the resource area during footing excavation.

For the conceptual Span Layout 2, the minimum clearance between the canal and lock and the estimated edge of footing is approximately 73' (see **Figure 2**). This should provide the contractor with an ample space to perform a traditional excavation without the need of a temporary shoring system to avoid possible encroachment into the resource area.

On southern embankment side, the access to the causeway is located in-between the existing canal and lock area. This provides construction equipment access to the causeway without having to encroach into the canal and lock area. If the access road to the below bridge area cannot be constructed on the northern embankment side, a causeway may have to be constructed across the entire river to access the northern embankment side from the southern embankment side. Even with this scenario we do not expect any permanent physical impact to the existing resource area as the access point to the causeway will not change on the southern side.

It is our opinion that the two span layout configurations (**Figures 1 and 2**) and shown limit of construction impact area depicted on **Figure 3** represent potential impact limits to the historic Rappahannock Navigation and Canal Lock #1, as well as any potential Section 4(f) resources. Therefore, it is our opinion that the potential alternates presented in this memorandum could be presented as feasible efforts to avoid and/or minimize impacts to the historic and Section 4(f) resources. And as mentioned, the final impact and avoidance to the historic and Section 4(f) resources will be determined during final design and construction and coordinated with VDHR, VDOT and FHWA prior to construction.



	PROJECT LOCATION MAP	
	Rappahannock River Crossing Project Stafford and Spotsylvania Counties, and the City of Fredericksburg, VA	

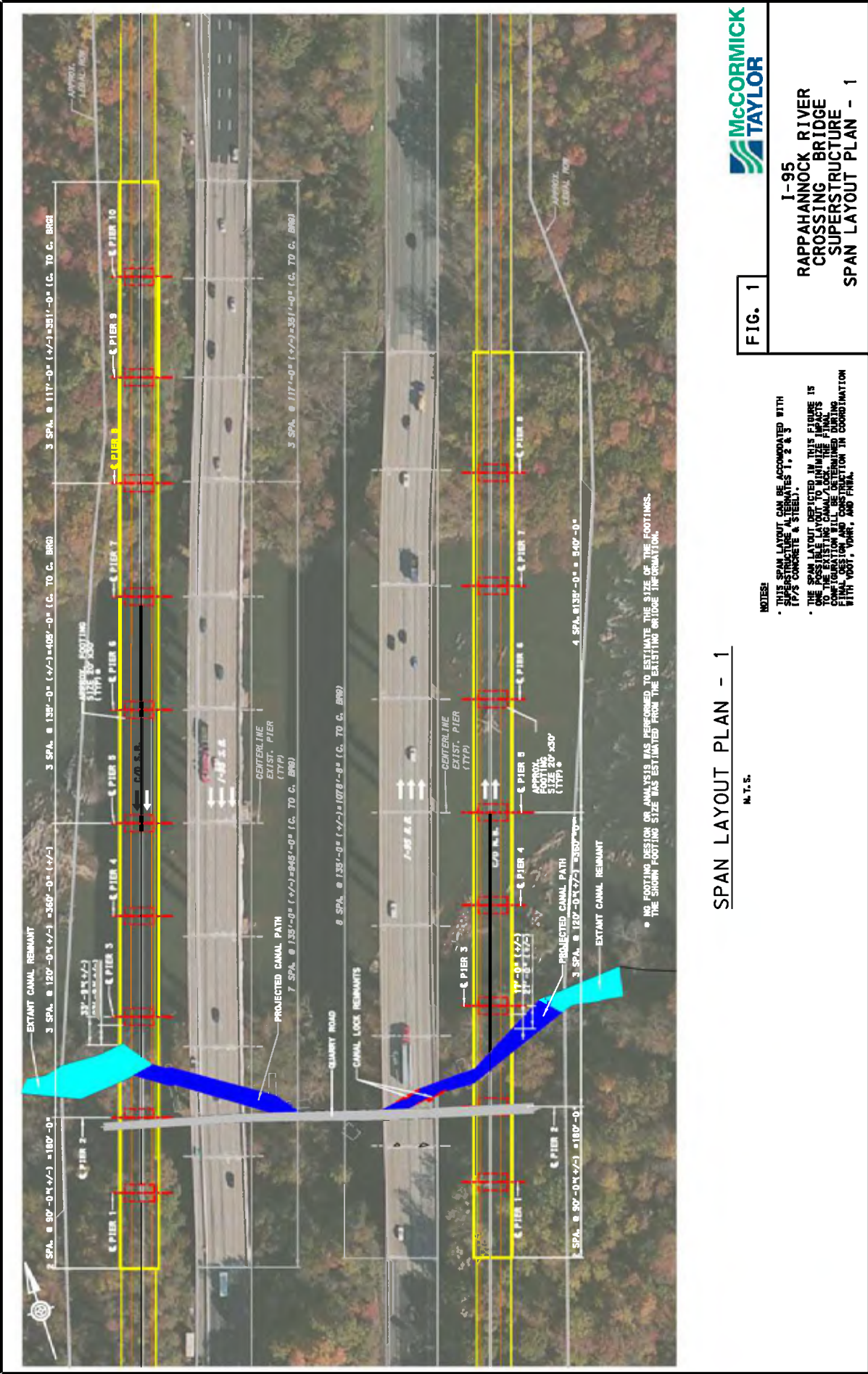


FIGURE 1

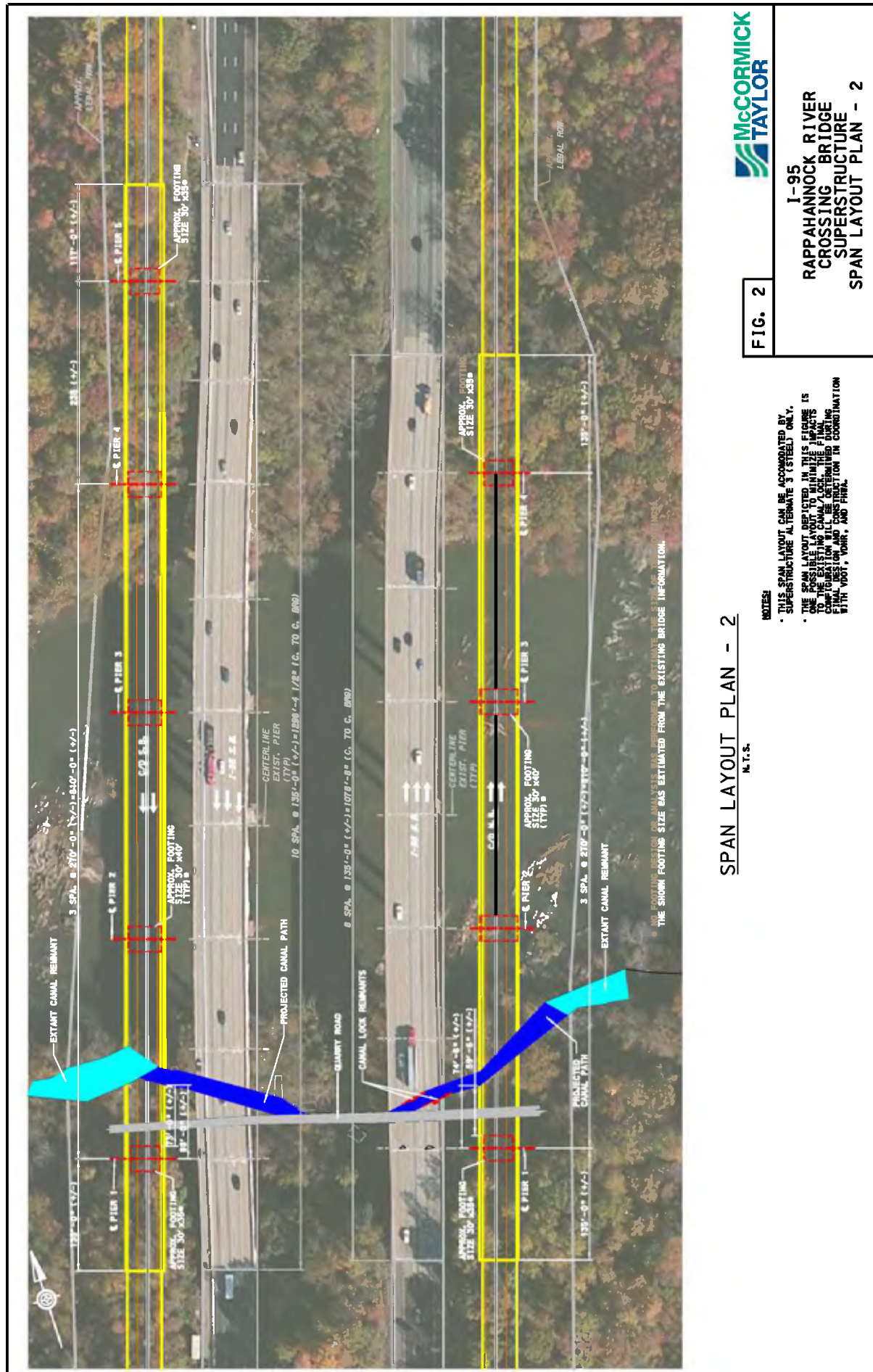


FIGURE 2



Appendix C

Section 4(f) Memorandum





Memorandum

TO: FILE

FROM: Brennan Collier and Jessica Browning – McCormick Taylor, Inc.

DATE: May 21, 2015

SUBJECT: I-95 Rappahannock River Crossing
Section 4(f) Memorandum
VDOT Project Numbers: 0095-111-259, P101; UPC 101595
and 0095-111-270, P101; UPC 105510

Section 4(f) resources include publicly owned parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the National Register of Historic Places (NRHP). The following presents a summary of the potential Section 4(f) resources within the project study area, along with a description of the anticipated impacts and potential Section 4(f) "use" of the resources.

SECTION 4(F) RESOURCE	ANTICIPATED IMPACT
Snowden Park	No Impact
City-Owned Recreational Lands	<i>De Minimis</i>
Pool Pass Trail	<i>De Minimis</i>
Scout/Embry Dam/Rappahannock Canal Trail	<i>De Minimis</i>
Proposed Celebrate Virginia/USGS Trail	No Impact
Cowan Boulevard Trail	No Impact
Proposed Fall Hill Avenue Trail	No Impact
Proposed Gateway Boulevard Trail	No Impact
Proposed Cannon Ridge-Ferry Farm Trail	<i>De Minimis</i>
Rappahannock Navigation	Potentially <i>De Minimis</i>
Battle of Fredericksburg I	Potentially <i>De Minimis</i>

Parks and Recreation Areas

Snowden Park

Snowden Park is a publicly owned and operated park/recreation area within the City of Fredericksburg as shown on Figure 1. The park consists of baseball fields and a playground located off of Fall Hill Avenue. Snowden Park would not be impacted by the project because its limits lie outside of the footprint of the Build Alternative. Therefore, there will not be a Section 4(f) use of Snowden Park.

City-Owned Recreational Lands

The City of Fredericksburg owns and maintains a 47.98 acre parcel (GPIN 7870-02-0135) on the east side of I-95, which is currently being used as recreational lands by various organizations. Most of this property is wooded and undeveloped; however, it contains the Sunshine Ballpark and various mountain bike trails. Both the ballpark and trails are park and recreation areas open to the public, although they are maintained and operated by private organizations through agreements with the City.

Administered by the Sunshine Ballpark Foundation and Fredericksburg Area Youth Development Foundation, Sunshine Ballpark consists of approximately nine acres within the larger City-owned parcel and contains a baseball facility that is partially constructed and in use. This property is still under construction with additional fields and parking lots to be added in later phases. The Build Alternative does not encroach upon the limits of the ballpark, as shown on its site plans.

Mountain bike and unpaved recreational trails also are located within the limits of the City-owned property, which are maintained and operated by the Fredericksburg Area Trail Management and User Group (FATMUG) through an agreement with the City, Friends of the Rappahannock and FATMUG. The locations of these trails are identified in FATMUG's Fredericksburg Quarry map (Figure 2) and also can be seen in Figure 1. None of the mapped trails within this City-owned property are anticipated to be impacted as a result of the Build Alternative. Because this City-owned property is intended for recreational use, the entire parcel is considered a Section 4(f) resource. The Build Alternative footprint may encroach upon approximately 0.1 acre of the undeveloped portion of this City-owned property where there are no existing or proposed recreational facilities. It is anticipated that impacts to this resource would be considered *de minimis*, so following the public hearing, the official with jurisdiction (City of Fredericksburg) will be contacted to confirm the minimal impacts and the intent of FHWA to issue a *de minimis* finding.

Pool Pass Trail

Pool Pass Trail is located on the west side of I-95 with portions of the trail located on City-owned land, VDOT right of way, and private property (Figure 2). Only the portion of the trail on City-owned land is considered a Section 4(f) resource. Approximately 0.04 acre of the two-foot wide trail within City-owned land may be impacted during construction of the Build Alternative. For the portions of the Pool Pass Trail that are considered a Section 4(f) resource, it is anticipated that construction activities can be managed to avoid or minimize impacts to the trail with the possibility of temporary impacts or temporary trail closure. It is further anticipated that impacts to this resource would be considered *de minimis*, so following the public hearing, the official with jurisdiction (City of Fredericksburg) will be contacted to confirm the minimal impacts and the intent of FHWA to issue a *de minimis* finding. In addition, Figure 2 shows a number of other unpaved recreational trails maintained by FATMUG within the project vicinity located on private property; these trails are not Section 4(f) resources.

Scout Trail/Embry Dam/Rappahannock Canal Trail

The Scout Trail (also referred to as Embry Dam and/or Rappahannock Canal Trail) is an unpaved trail located below the existing I-95 bridges along the south bank of the Rappahannock River (Figure 1) on City-owned property, VDOT right of way, and private property. This trail is not currently mapped in the City's GIS data as a trail or park, but the Fredericksburg Pathways 2006 Plan mentions this as a planned trail to link the Canal Path trail to the east with the Celebrate Virginia facility (and planned trail) to the west. In addition, the trail is shown as an existing trail in FATMUG's Fredericksburg Quarry map (Figure 2). This trail is open to the public with future plans for improvement, according to the Fredericksburg 2007 Comprehensive Plan, and would be considered a Section 4(f) resource. Both the existing and proposed improvements to the trail would intersect the Build Alternative's construction footprint for the new/widened bridges. Approximately 0.3 acre of this two-foot wide trail is anticipated to be impacted by the project and would be considered a Section 4(f) use. A Technical Memorandum prepared by McCormick Taylor dated May 20, 2015, that provided an overview of feasible bridge configuration alternatives along with constructability options, indicates that any piers needed to support the two proposed Collector/Distributor (C/D) bridges can be positioned to avoid direct impacts to the existing trail. Additionally, construction access could be managed to minimize impacts to the trail with temporary impacts as a consequence of construction activities. Established portions of the recreational trail impacted by construction activities would be rebuilt following bridge construction. It is further anticipated that impacts to the resource would be considered *de minimis*; following the public hearing, the official with jurisdiction (City of Fredericksburg) will be contacted to confirm the minimal impacts and the intent of FHWA to issue a *de minimis* finding.

Proposed Celebrate Virginia/USGS Trail

The proposed Celebrate Virginia/USGS Trail is located on the west side of I-95 with the easternmost limit near the quarry parking lot on City-owned property. At this point, the trail intersects with the Scout/Embry Dam/Rappahannock Canal Trail and the Pool Pass Trail and continues westward along the Rappahannock River outside of the project study area on both public and private lands. The Build Alternative design would not impact this trail; therefore, it would not be a Section 4(f) use.

Cowan Boulevard Trail

Cowan Boulevard Trail is an existing facility along the sidewalk of Cowan Boulevard, and it is carried over I-95 by the Cowan Boulevard Bridge (Figure 1). Because the Build Alternative's conceptual design does not propose any modification to the existing Cowan Boulevard Bridge or the trail, there would not be a Section 4(f) use of this existing resource.

Proposed Fall Hill Avenue Trail

The proposed Fall Hill Avenue Trail is identified in the City of Fredericksburg's Comprehensive Plan and Pathways Plan as being located alongside Fall Hill Avenue, utilizing the publicly owned sidewalk that crosses over I-95 on the Fall Hill Avenue Bridge (Figure 1). This trail is located on City-owned land and therefore is considered to be a Section 4(f) resource. The Build Alternative I-95 Rappahannock River Crossing Section 4(f) Memorandum May 2015 does not propose any modification to this bridge or the proposed trail; therefore there would not be an impact to and/or use of this Section 4(f) resource.

Proposed Gateway Boulevard Trail

The proposed Gateway Boulevard Trail is identified in the City of Fredericksburg's Comprehensive Plan and Pathways Plan but does not yet have a defined alignment. The trail would be associated with a new roadway to be designed and constructed by private developers for public use. The proposed Gateway Boulevard Trail would not be impacted by the project because it is outside of the footprint of the Build Alternative. Therefore, there will not be a Section 4(f) use.

Proposed Cannon Ridge-Ferry Farm Trail

The Cannon Ridge-Ferry Farm Trail, as shown on Figure 1, is a planned trail along the north bank of the Rappahannock River beginning near the Cannon Ridge Golf Club and running alongside the Rappahannock River to Belmont near Route 1. The trail is identified in the Stafford County Geographic

Information System (GIS) data and is in concept phase with no funds identified for design and construction of the proposed trail. Although this trail is still in the concept phase, it is still considered a Section 4(f) resource. Approximately 0.2 acre of temporary impact is anticipated in the proposed trail location. Portions of the proposed trail established before construction would be temporarily impacted by construction activities and would be rebuilt. Lastly, it is anticipated that any impacts to this resource would be considered *de minimis*; following the public hearing, the official with jurisdiction (Stafford County) will be contacted to confirm the minimal impacts and the intent of FHWA to issue a *de minimis* finding.

Wildlife and Waterfowl Refuges

There are no wildlife or waterfowl refuges found within the project study area.

Historic Properties

There are two historic properties within the study area that are considered Section 4(f) resources:

- Rappahannock Navigation (DHR Inventory No. 111-0134), represented by two elements that contribute to the NRHP-eligibility of the resource:
 - Subsurface remains of Canal Lock #1/Minor's Lock (111-0134-0001/44SP0074)
 - Above-ground and subsurface remains of Rappahannock Canal (111-0134-0002/44SP0064)
- Fredericksburg I Battlefield (111-5295)

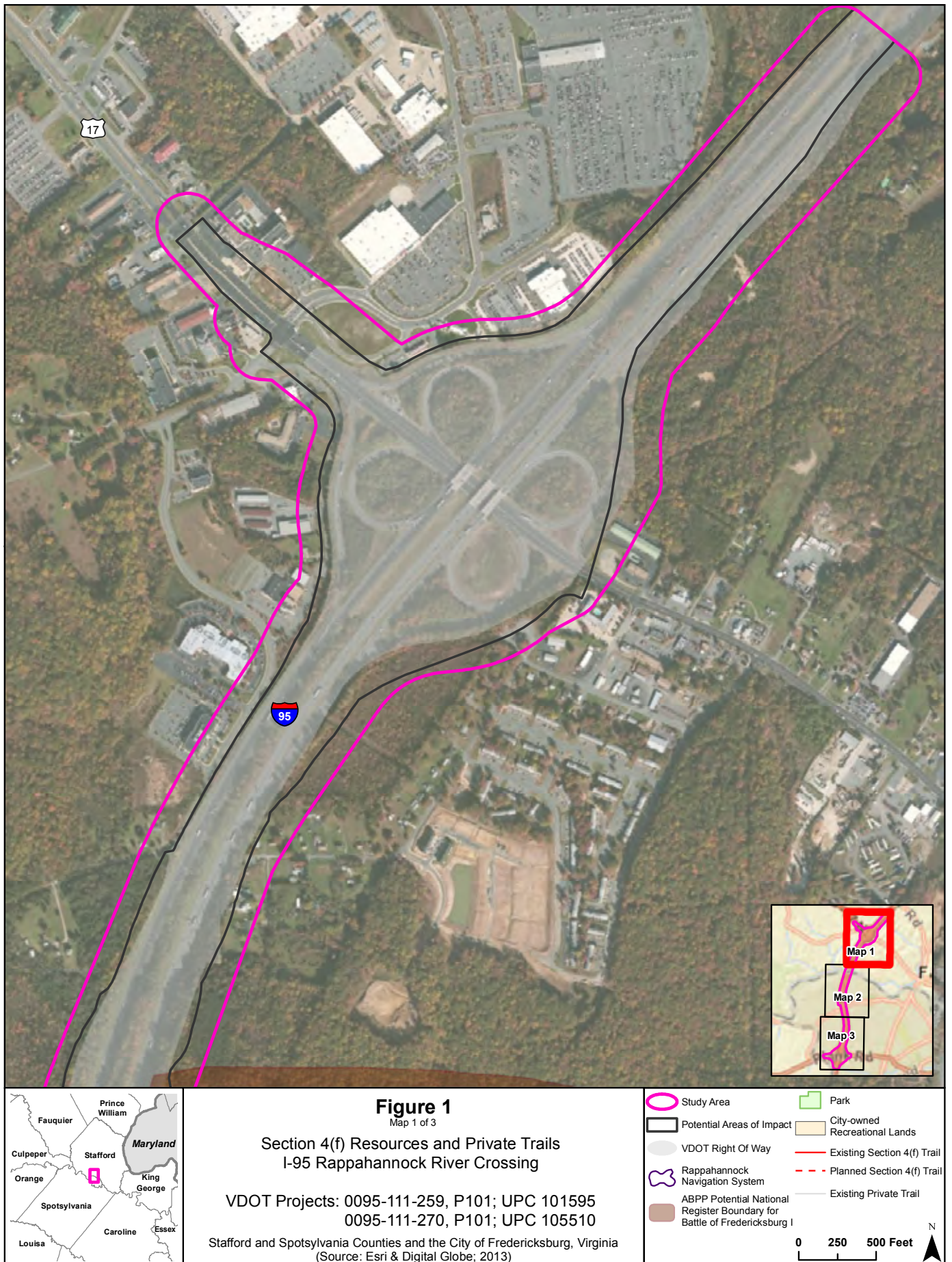
Rappahannock Navigation

These components of the Rappahannock Navigation system are located near the edge of the south bank of the Rappahannock River underneath the existing I-95 bridges (Figure 1). The lock (111-0134-0001/44SP0074) and some sections of the canal within the study area (111-0134-0002/44SP0064) are represented only as archaeological remains. Because these components contribute to the physical continuity of the linear Rappahannock Navigation system as a whole and would enhance public interpretation and any potential reconstruction of the historic transportation resource, they have more than minimal value for preservation in place and, thusly, are not important chiefly because of what can be learned by data recovery.

Archaeological investigations of the lock and the portions of the canal within the study area have not yet been coordinated with the State Historic Preservation Officer (SHPO), but potential feasible bridge configuration alternatives, along with constructability options, have been evaluated to determine if project impacts on the Rappahannock Navigation could be avoided. The options previously mentioned in the Technical Memorandum prepared by McCormick Taylor dated May 20, 2015 indicated that any piers needed to support the two proposed C/D bridges maybe positioned to avoid direct impacts to the Rappahannock Navigation. Additionally, construction access can be managed to avoid or minimize any access on or across the remains of the canal system. If access across the canal system does prove necessary, impacts to the remains of the lock and canal may be avoided by limiting construction access to areas where only below-ground remains of the Rappahannock Navigation survive and placing a temporary protection system, such as fill or a construction bridge, over those areas. In summary, it appears to be possible to design and manage construction of the project so that, in regard to Section 106, the effect on the Rappahannock Navigation will not be adverse and the Section 4(f) impact will be *de minimis*. *(This determination remains to be coordinated with the SHPO.)*

Fredericksburg I Battlefield

The Fredericksburg I Battlefield intersects the project study area on the east side of I-95 in Stafford County and the City of Fredericksburg (Figure 1). The SHPO has concurred that the historic property boundaries of the Fredericksburg I battlefield are the "Potential National Register lands" identified by the American Battlefield Protection Program in its report, *Update to the Civil War Advisory Commission's Report on the Nation's Civil War Battlefields: Commonwealth of Virginia* (2009). The boundaries comprise 3,290.59 acres, and the western end of the battlefield extends into the project study area (Figure 1). Approximately 6.5 acres of the battlefield are within the project study area and Area of Potential Effect (APE). Based on the Build Alternative's conceptual design, proposed cut and fill boundaries would encroach into approximately 1.6 acres of the battlefield and would likely need to be acquired for the project. This section of the battlefield is far removed from where known fighting occurred during the Battle of Fredericksburg I (December 11-15, 1862), and the cultural resource surveys conducted within the project study area have identified no above-ground or archaeological resources associated with the battle that could be impacted by the project. Further, integrity of the historic setting and feeling of the portion of the battlefield within the study area already has been diminished by the development of a quarry, gravel pit, associated dirt and gravel access roads, and I-95 itself. For these reasons, it is believed that the project will have no adverse effect on the Fredericksburg I Battlefield and the Section 4(f) impact will be *de minimis*. *(This determination remains to be coordinated with the SHPO.)*



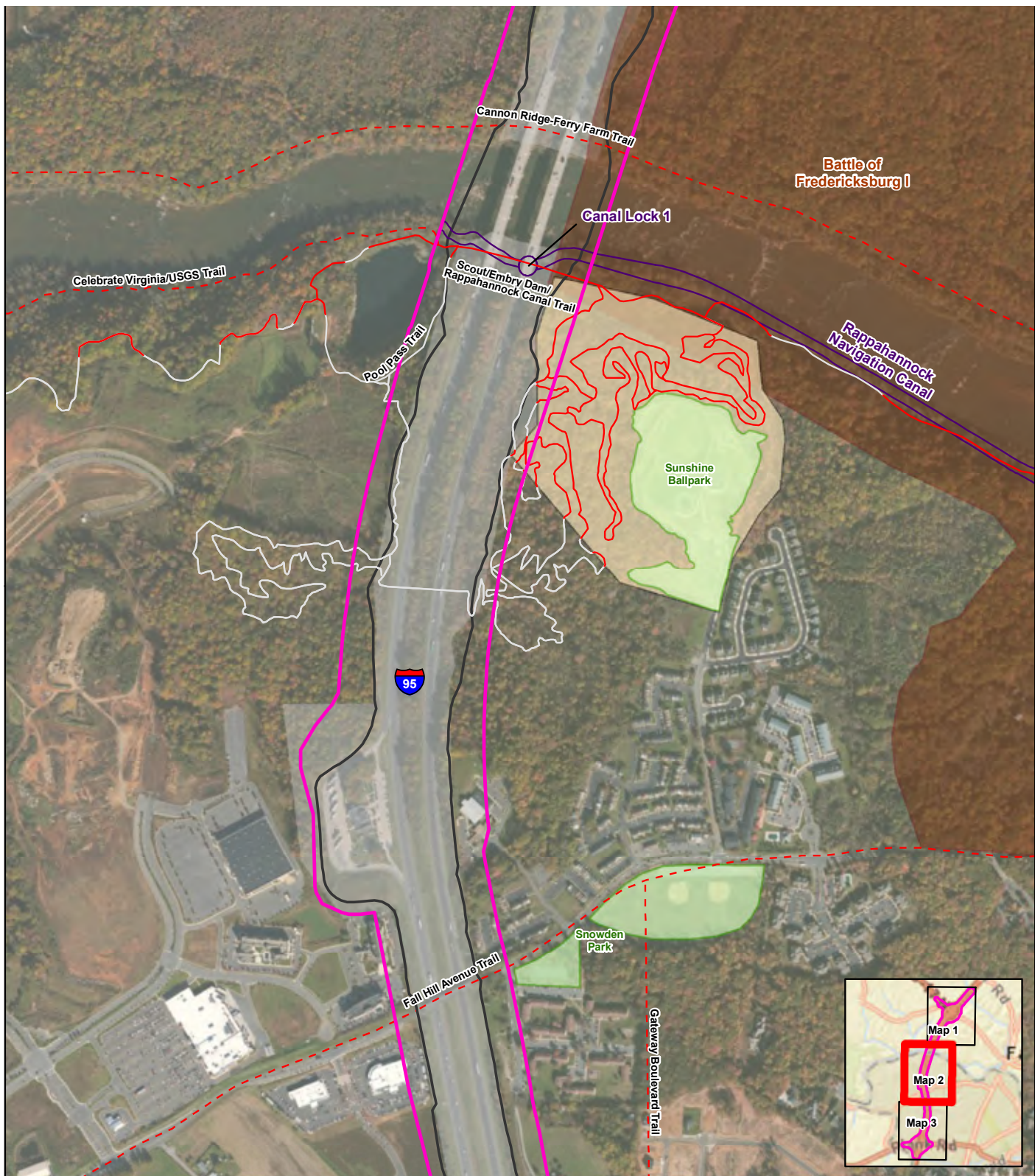
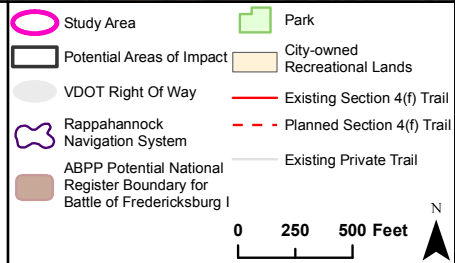


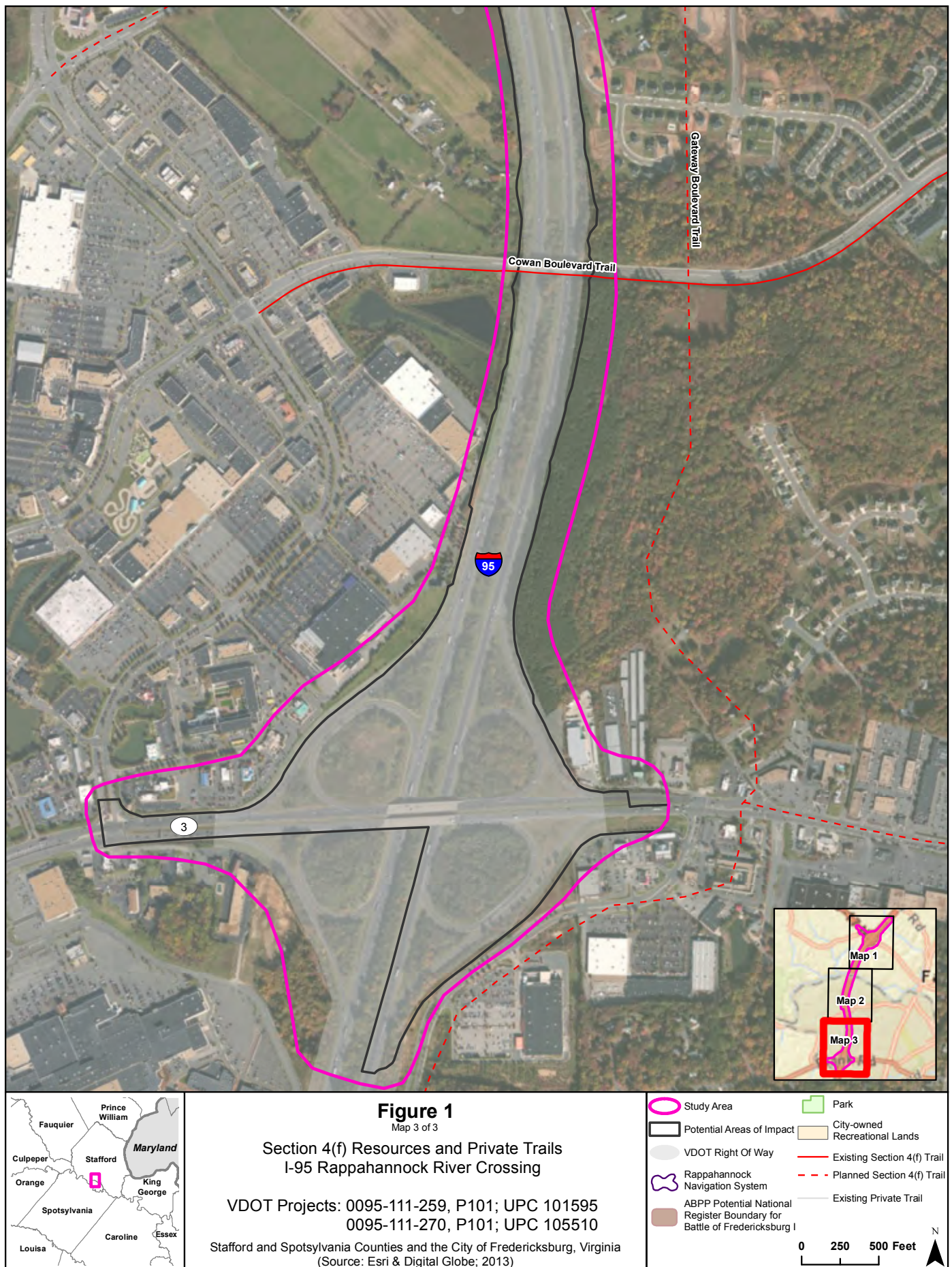
Figure 1
Map 2 of 3

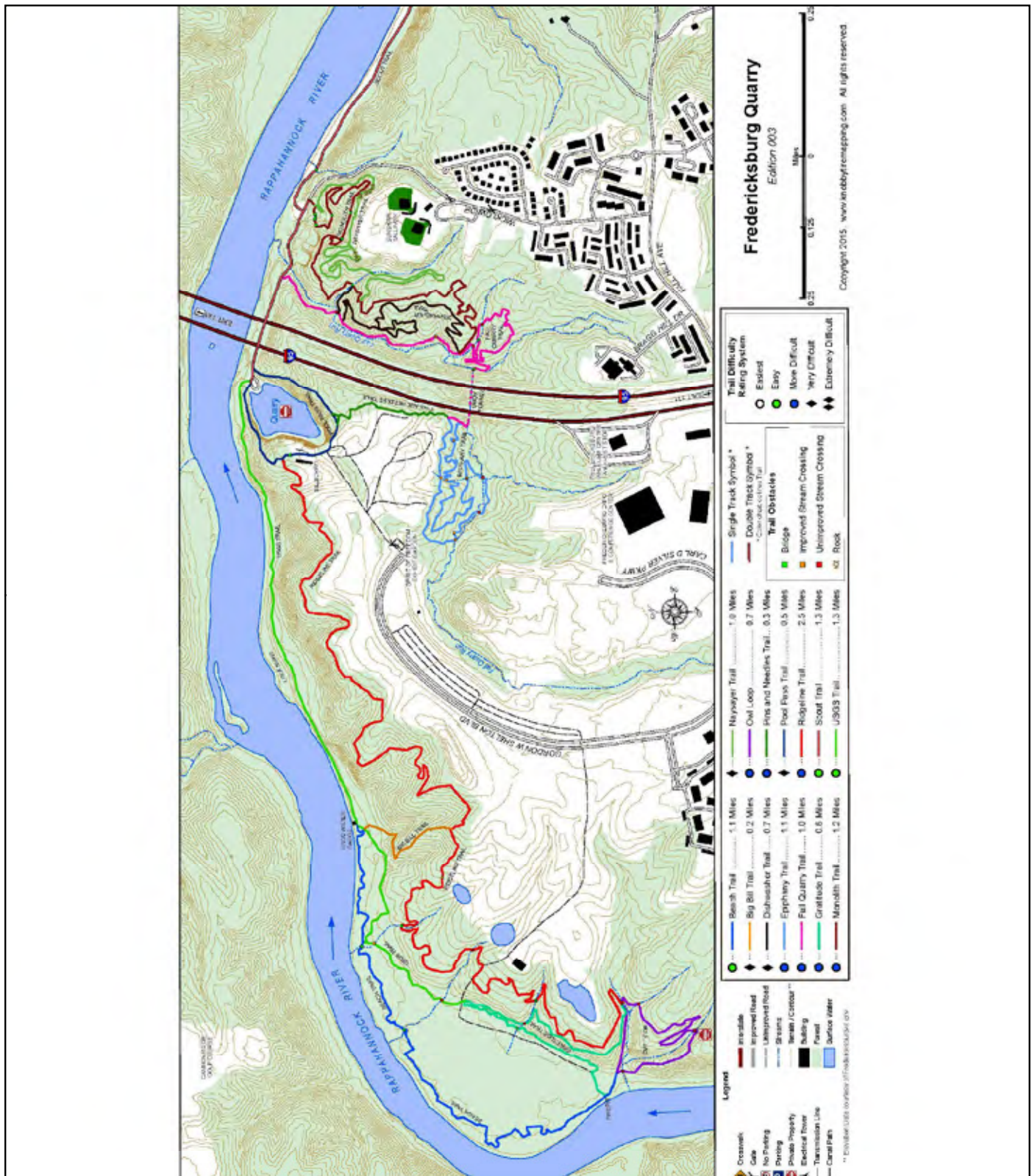
Section 4(f) Resources and Private Trails
I-95 Rappahannock River Crossing

VDOT Projects: 0095-111-259, P101; UPC 101595
0095-111-270, P101; UPC 105510

Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia
(Source: Esri & Digital Globe; 2013)





**Figure 2**

FATMUG Trails Map
I-95 Rappahannock River Crossing

VDOT Projects: 0095-111-259, P101; UPC 101595
0095-111-270, P101; UPC 105510

Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia
(Source: Esri & Digital Globe, 2013)

